

The Science Fair

The Science Fair

A Juvenile Science Adventure Novel

By Julian T. Rubin

julianrubin2000@yahoo.com

The Science Fair

Joab and Dina - thirteen and twelve years old - live in a little town in Israel. In the holidays, they solve scientific detective mysteries with the help of their German Shepherd dog - a hobby that their mother dislikes.

This time they are engaged in a mystery that involves a few interrelated scientific hot topics like ethanol fuel, solar energy, genetic engineering and photosynthesis.

The mystery is about the race between two renewable energy companies to be the first to invent a new promising technology.

On their way, they find a lost dog, compete in a chess tournament, investigate a deserted farm on a dark night, participate in a treasure hunt game and are stuck on the top of a Ferris wheel at the Luna Park.

A science fair event is running in the background and at the end, when Joab and Dina present their project, everything falls into place and the mystery is unfolded.

The Science Fair

Contents

1. The Science Gumshoes Detective Agency
2. The First Job
3. Where Is Jojo?
4. Another Job
5. The Chess Competition
6. What is a Chess Opening
7. What is Photosynthesis
8. Sniffy
9. What is Switchgrass
10. At the Farm at Night
11. Energy Castles
12. The Chess Simultaneous Exhibition
13. First Week Observations
14. The Treasure Hunt
15. The Second Riddle
16. Second Week Observations
17. Joab and Dina Have Fun at the Luna Park
18. Three Religions
19. The Fourth Riddle
20. Auntie Bertha's Birthday Party
21. The Science Fair Event
22. Joab's and Dina's Project

The Science Gumshoes Detective Agency

Joab was sure that even school could not be worse than a long boring summer vacation that he was facing now, especially if he lived in Dimona - a little desert town in Israel.

He was a dark, curly-haired boy with glowing black eyes, about thirteen years old. He had on shorts, a T-shirt, white sneakers and brown socks -or, more precisely, one sock was brown. The other was beige, proof of a late start that morning.

Joab resettled his book bag on his shoulders with one quick movement, on his way home, leaving behind the last school day before summer vacation begins, looking forward to fun.

He stopped by a grocery and bought a big chocolate bar. Munching the chocolate hungrily, he felt a delightful tingle down his back as his thoughts turned to the last summer adventures.

He remembered how they had found Hannah's jewelry box on her tree; the dangerous letters they had discovered on the leaves of bee orchids; and the fun when Ruthy, the mysterious old scientist, had trapped them in her wonderful orchid garden after they had been disguising themselves as sales persons. He remembered the excitement they had when they sent Blacky, their German Shepherd, on a successful electronic surveillance mission. What a biggie vacation this one was.

Joab turned into his street, a short narrow road lined with little stone houses with slanting red roofs and tall palm trees. He walked blissfully down the street, munching further the chocolate. Better finish it before I get home, he thought. Otherwise, the little ones will want some.

At the same time Dina, Joab's sister, a tall, slim girl of twelve with black plaits, glittering metal braces on her teeth and a few freckles on her nose was sitting on the floor in the shed, they shared during the summer, that was placed at the bottom of their garden. She was stroking lovingly Blacky, their big black German Shepherd who was licking passionately her left leg.

The Science Fair

She remembered, biting her nails nervously, the last vacation troublesome mishaps that Joab had trapped her unwillingly into. Especially, how they were scared to death by the old Ruthy after she trapped them in her garden and how both of them shed plenty of tears; the private math lesson that Joab had tricked her into and how much she suffered then...only God knows...; She remembered that they had been almost arrested by the police for destroying vital evidence; and the worse of all - the hard time she had got from their mother because of all these stupid police games of his. She's not going to let him spoil her another vacation, never...and...

Her thoughts were interrupted when Joab stormed through the shed's door, lowered the book bag from his shoulders with a sigh of relief and flung it across the room.

"Summer vacation...uh? I hope it's not going to be a boring one." Said Joab.

"For me it won't be a boring one" said Dina, "I'll teach Blacky some new tricks and weed the garden and..."

"I mean more than that."

"I'm fed up with your childish games, Jobby, what happened the last summer was enough, wasn't it?"

Joab burst out laughing.

"We'll see who gets the last laugh! I think Mom is absolutely right. They ought to shut down that silly police club of yours. In any case, Jobby, I'm going to be very busy this vacation. I have to weed the garden, hang the bee orchid pictures and teach Blacky some new tricks. I'm sure you understand that I don't have time for childish games. Right, Blacky?"

Blacky barked with excitement, hearing his name mentioned.

"Good boy, good boy," said Dina, stroking with affection his big black head as he licked her bare knee.

"I'll help you weed, hang the pictures and train Blacky. I promise," pleaded Joab.

Dina unwrapped a chocolate bar, bit into it and said hardly concealing a self-satisfied smile, "I'm fed up with your promises."

The Science Fair

"But this time will be different, you'll see."

"No way."

"I'll clean the shed every day. I'll let Blacky sleep in my bed if he wishes. I promise."

"No way."

"Come on, better to stay bored to death at home?"

"Then what you suggest for example?"

"To make money, and a lot of it!"

Dina, tuck again into her chocolate bar and said, "How do you suggest doing this?"

"It's time to set up our private detective agency," said Joab full of his own importance.

"You and your childish ideas again," said Dina Laughing.

"Why not Dinny?"

"Because Mom and Dad are not going to allow this again - late night activities, complaints from all over the globe, you know..."

"Well," said Joab, "We can hire for some sensitive late night missions Hallelujah Bat Israel."

"You mean the Black Hebrew girl, the hacker?"

Dimona is home to Israel's 3000 Black Hebrew community. The Black Hebrews are groups of people mostly of Black African ancestry situated mainly in the United States who believe they are descendants of the ancient Israelites. Their dietary laws prohibit the eating of meat, dairy products, eggs and sugar and they wear colorful clothing. They have created their own music genre and their musicians perform across Israel and around the world. Nevertheless they maintain some Jewish rituals and bear Hebrew, Biblical names, they are generally not accepted as Jews by the Jewish community.

"Exactly, the hacker," said Joab satisfied, "something wrong about it?"

The Science Fair

"Maybe it's a good idea to get some help from her but how, on earth, are we going to pay her?"

"Well...well...we can ask her to be a partner of our detective agency or pay her from our profits."

"Profits?"

"Well...we..."

"But how are you going to make this detective agency of yours, clever Albert...ah?" said Dina.

"Easy as ABC, first we'll have to choose a name for our new detective agency and I suggest The Science Gumshoes Detective Agency."

"What a horrible name for a detective agency, I have never heard such a strange word" Dina said laughing, "What on earth is 'gumshoes?'"

"What, you don't know?"

"Then tell us clever Albert."

"Well, a gumshoe is slang for a detective or private investigator, maybe because detectives need to go unheard in order to do a good Job."

"But what an ugly name," said Dina wincing, "I think Blacky's Friends is a better choice."

"Who is going to offer a job to Blacky's Friends," burst Joab into a high pitched laugh pointing amused at Blacky, "Ha-ha-ha!"

"You disrespect him again," said Dina patting his fur with affection, "How dare you forget what Blacky did for us last summer."

"I'm really sorry," said Joab hardly muffling his laugh, "you are totally right about Blacky's talents but one may think that Blacky's Friends is a music band rather than a serious detective agency."

"Oh my dear, a serious detective agency...ah!" said Dina, "You have totally forgotten our last summer mishaps, ha-ha-ha!"

The Science Fair

"Well...but in the end we did it and solved the mystery, didn't we?"

"But with the help of dear Blacky," said Dina looking proudly at the big German Shepherd gnawing on a bone in a corner. "And besides, I don't understand what 'science' has to do with this foolish detective agency of yours?"

"Don't you remember that we employed some sophisticated scientific methods to solve the mystery?"

"You destroyed every possible scientific evidence, especially the orchids, and Inspector Amos almost arrested us for this and..."

"Well...but in the end we did a good job, didn't we?" said Joab, embarrassed, "it's time to stop this trash speaking and go on with our detective agency. I think that 'science gumshoes' has a serious appeal and everybody will be willing to hire our services."

"Okay, okay," said Dina, "let it be your way...'The Science Gumshoes Detective Agency' but at least Blacky will be our logo."

"A wonderful idea," agreed Joab excited, "A black German Shepherd will do a great job as a detective agency's logo. German shepherds are associated with police work, don't they?"

"You see, you see," said Dina satisfied looking proudly at Black, which now moved to another corner of the room, leaking his paws.

They had been always amazed by Blacky's high intelligence and skills and wondered about it.

In 1899, a German cavalry captain, was attending a dog show when he was shown a dog named Hektor. Hektor who was allegedly one-quarter wolf was the product of a few generations of selective breeding, and completely fulfilled what he believed a herding dog should be. He was pleased with the strength of the dog and was so taken by the animal's intelligence, loyalty, and beauty that he purchased him immediately. Hektor was declared the first German Shepherd dog and was added to the breed register.

The Science Fair

Hektor was bred with other registered dogs that displayed desirable traits and after that his most successful offsprings were interbred in order to establish the German Shepherd breed.

Joab found the puppy Blacky abandoned in a cottage at two months of age and from then he was with them three years now.

Dina loved Blacky mostly because of his kind nature and loyalty but Joab liked him because German Shepherds were employed by the police around the world to do police work like tracking criminals, patrolling and locating drugs and explosives.

"Din, we need to hurry!"

"What...what..." said Dina waking out of a nice dream about German Shepherds.

"We need to hurry!"

"What the great emergency?"

"Well...rumor says Nir the inspector Amos' son is also going to open his own detective agency soon, so we need to open ours as soon as possible in order to be the first to get the big clients...you know...money...fame..."

Nir was Joab's chief competition when it came to trying to solve mysteries and a member of the police club as well.

"Jobby, Jobby," said Dina smiling, "you are not going to stop dreaming, are you?"

"But you can't deny," said Joab victorious, "that we were mentioned in the papers last summer, weren't we?"

"Only trouble we got from Mom and Dad because of this."

"This time it's going to be different, trust me! You'll see!"

"Then what now?"

"First of all we'll need a decent visit card", said Joab poring over his laptop while Dina was bending looking behind him.

After a few minutes Joab straightened up, "that's it!"



The Science Gumshoes Detective Agency

Lost your pet? Your bicycle vanished in thin air?

We are the right people to bring them back!

detective.agency@sciencegumshoes.com

For more information: sciencegumshoes.com



"But you don't think," said Dina, "That we must leave some contact information besides email like our names and a phone number?"

"The best thing for us is to stay in the shadows for now," said Joab, "leaving only our email hints to secrecy, don't you think so?"

"Don't fool me around," said Dina, smiling, "you are afraid that Mom is going to see this and she is not going to allow us to play cops and robbers again, well Jobby?"

"I think that you are right," admitted Joab unwillingly, "but honestly Din, secrecy appeal is also an important consideration in this matter, isn't it?"

"I see that we have a web site, this sciencegumshoes.com, what about matching Facebook, Twitter or Google Plus pages for our business?"

"Absolutely not, don't you know that social networks pose some security and privacy concerns and as a matter of fact real detectives don't have such accounts, trust me, I read about this."

The Science Fair

"I don't understand."

"Say," said Joab, "that you post on Facebook or Twitter that dear Blacky learned a new trick."

"I did it many times, so what?"

"So what," said Joab alarmed, "don't you know that people use their pet name, many times, as a password?"

"I don't need to worry" said Dina relived, "my password is 'blacky2010' and not 'blacky', what lucky I'm."

"Then change your password immediately!"

"I don't understand, but 'blacky' isn't 'blacky2010', is it?"

"For God's sake Din, 2010 is Blacky's year of birth, isn't it?"

"But nobody knows it."

"Really?"

"I don't understand."

"Everybody knows it since you celebrate dear Blacky's birthday every year on the web... 'my dear Blacky is three years old'" said Joab mimicking his sister. "This combination of pet names and their year of birth is a very common combination for passwords and all of your Facebook friends, friends of their friends and strangers can try this."

"Wow! I'm going to change all my passwords right away Jobby."

"And besides," said Joab, "one can break into your account with 'blacky' alone, without even knowing his year of birth."

"How comes?"

"When you sign up an online account, after choosing a user ID and a PW, you are asked some security questions that you have to answer just in case you need to

The Science Fair

recover your password if you forget it, and I bet Blacky stars on your list of security questions and..."

"I understand, I understand, Nir can try to sign in my email or Twitter accounts and when denied because he doesn't know the password then in order to recover it he is asked to answer security questions like pet's name or school, and presto... he knows all my secrets. What a stupid mistake."

"But passwords are not the only matter of concern," Said Joab, "how many times you posted that you are going to visit a friend for the day, didn't you?"

"So what?"

"Do you think that is good for a detective to disclose his whereabouts? Nir can use this information to his advantage, and besides, if one knows that we aren't at home he can break into our shed and install some eavesdropping equipment or photo secret documents of ours, and there are also pictures on Facebook that can reveal sensitive information ...what, you don't read the papers?"

"You have seen too many movies, Jobby."

"Can you, please, be serious just for a moment?"

"Okay...okay...then what should we do?"

"We must use strong passwords and security questions consisting arbitrary letters and numbers and not simple detectable words like 'blacky' and think carefully about what we are telling on the web. As a rule of thumb – less blah blah is better than more."

"So it's crystal clear that Facebook and Twitter are not good for us," said Dina knowingly.

"Not necessarily, sometimes a detective can use them to his advantage, following and making friends at his choice, waiting for mistakes of others to uncover vital information, but certainly better not to have personal accounts at all...yes..."

"Science Gumshoes, Jobby."

The Science Fair

"Oh yes...we don't need Facebook or Twitter, all we need is the reliable sciencegumshoes dot com website that is totally under our control in which we are going to tell the world about our services, fares and of course about our success."

"Our success?"

Joab ignored his sister's offending remark, "I'm going to post our visit card and website on a few free web billboards and a cheap ad on the Dimona Gazette. I'm going to print a few visit cards to give them to prospective clients. For now, better not to tell our friends about our detective agency, let's keep it secret for the time being."

"And don't give Mom a visit card by mistake, ha-ha-ha."

"Of course not thickhead."

"But only one condition," said Dina, "all the profits fifty fifty, without tricks."

"Agreed, but also the expenses, Din."

"What expenses Jobby?" said Dina worried.

"It's only a Joke."

"To tell you the truth," said Dina, "I have a better idea for making money."

"Then tell us meathead."

Dina opened a shrieking drawer, snatched out a piece of paper, and laid it unfolded on their big homework table, which was located in the middle of the shed.

It was an ad from the Dimona Gazette:

=====

Your are invited to take part in the Solar Deserts Science Fair scheduled for Tuesday, August 6th, 2013.

The theme is renewable energy.

The event is open to all ages.

The contest will be divided into the following categories:

The Science Fair

Elementary school, middle school, high school, college and adults.

The first prize in any category will be 1000 shekels, the second 500 shekels and the third 250 shekels.

Registration is now open: contact sciencefair@solardeserts.com

The science fair is sponsored by Solar Deserts, a leading renewable energy start-up located in Dimona, Israel.

=====

"What do you say, Jobby?"

"For 1000 shekels, if we win at all, to work all the summer, it's crazy Din."

"A bird in the hand is worth two in the bush."

"Birds?" said Joab confused.

"It's only a saying, thickhead," laughed Dina, "what I mean is that if we put our heads together maybe we can win a prize at the science fair, but with your detective agency...laugh out loud!"

"We shall see!"

The First Job

Dina welcomed Joab with a broad smile, "I think we got our first Job."

"Biggie!" Joab danced around the room while Blacky joined scampering.

"It's a guy called Daniel Cohen, lost a small beige Miniature Pinscher. Asked us to come to his place at three PM today, left address and his mobile."

Joab signed in their detective agency email account from his mobile and read it loudly to Dina's satisfaction.

"You see, Blacky's logo did the trick." Said Dina caressing Blacky's nose.

"Okay...okay," agreed Joab satisfied and patted Blacky's back energetically, raising clouds of dust. Blacky moved away, annoyed, and lay down by Dina's left leg as always.

"And to think that you suggested that stupid science fair project of yours, Din."

"Well..."

Joab pored over his mobile again and acknowledged the appointment at three o'clock PM and then he said worried, "how on earth can one find a missing dog Din?"

"Trust me!" said Dina satisfied, "don't you remember that I volunteered many times to find lost dogs?"

"Then tell us clever Albert, how do you find a lost dog?"

"As easy as ABC," said Dina glad of the opportunity to demonstrate her knowledge, "don't worry, be happy Jobby."

Daniel Cohen's house was a large one with a well-tended garden embedded with fragrant and colorful flowerbeds, fruit and ornamental trees.

The Science Fair

At three PM sharp Joab and Dina stood in the front of Daniel Cohen's large and heavy entrance door. Joab pressed the bell button with some hesitation and a pleasant melody answered from behind the door.

After a few seconds, the door was opened ajar and a young good-looking man about forty welcomed them beamingly.

"Hi guys, I'm Daniel Cohen, I'm waiting for you, I suppose that you are the famous Joab and Dina," he said smiling, shaking hands with them warmly.

"Oh!"

"Don't be too much surprised, I have seen your anonymous ad somewhere and I guessed that you are the detectives in question...this fantastic German Shepherd...lost dogs and bicycles...well...Dimona is a small place, you know, and rumor is everywhere. You did an admirable job with the orchid mystery last summer."

"Thanks, Mr. Cohen." smiled Joab politely.

He invited them inside with his open palm pointing to the middle of a large well-furnished living room.

They sat on a comfortable sofa and he sat across a small square table on a large couch. Then Daniel called for his wife and she served them with a plate full of cookies and a big bottle of lemonade accompanied by tall water glasses.

"Sorry, I must go to get Tom back from his music class," she said politely and left the house.

"Thanks Mrs. Cohen," Joab and Dina said in chorus.

"Help yourself," Daniel said, and they found the cookies and lemonade really inviting.

"Let's begin," said Daniel with a grim look on his face.

"Could we please use our tape recorder, just in case..."

"Of course...of course, please," said Daniel and Joab snatched a small tape recorder from his pocket, placed it on the table before him and switched it on.

The Science Fair

"Well," began Daniel sadly, "our Jojo was lost, I only hope he wasn't knocked out by a car or ran into dangerous hands. We speak about a beige mixed male Miniature Pinscher, three years old, escaped two days ago through a hole in our garden fence. Our son, Tom, nine years old, is very upset about that."

"Was Jojo subjected to fireworks, panicked or maybe shocked by somebody, something?" asked Dina, "A terrified dog will sometimes run far away and lose his smell sense and orientation. Many dogs will be so terrified from loud fireworks that they will hide from people in strange places and even not recognize their owners and this of course can complicate recovery."

"I don't remember any such catastrophic event for now," said Daniel thoughtfully, "but I'll ask Tom and my wife and if something comes up I'll notify you."

"I noticed that you have some security cameras installed," said Joab with interest, "have you checked maybe Jojo had strayed outside at night, who knows."

"That's the first thing we did," said Daniel disappointed.

"Is it possible that somebody has stolen your dog?" inquired Dina.

"Everything is possible of course," said Daniel, "Jojo is not a prodigy and Pincers are not valued like German Shepherds for example; they are noisy, bark a lot and they are a small not impressive breed, there are lots of them around and not many are enthusiastic to adopt them, so I don't think so."

"But maybe out of revenge?"

"A very farfetched Idea."

"I guess you have made some efforts to find him," said Dina.

"Of course... of course, we looked after Jojo in the neighborhood, yards, parks, etc. but to no avail. We are aware, of course, that we should do more, but regretfully we are very busy these days and that's the reason we think that the best course to take in this matter is to hire you kids...I mean The Science Gumshoes Detective Agency."

"Before we forget," said Dina politely, "we hope you have mended the gap in your garden fence. So this will not happen again."

The Science Fair

"Yes, we did it, of course."

"First of all," said Joab, "we need a digital photograph for flyers, posters, ads, etc."

Daniel produced from a drawer the last issue of the Dimona Gazette, flipped it quickly and a small colorful pinscher emerged from between the pages.

"A small reward is also included."

"Can we have the Gazette," asked Joab politely.

"Of course, I've another copy."

"And calls?"

"Only one," replied Daniel disappointed, "I'll send you a few more photos to your email you provided ASAP."

"Is Jojo friendly?" went Dina on with her inquiry.

"Yes, yes, very friendly indeed."

"Then we have good news," said Dina satisfied, "it's much more easy to recover an outgoing dog than a shy one since it befriends humans and other dogs and generally wanders in the open, while a shy dog hides under cars, bushes or in garages, much more difficult to locate. But on the other hand small dogs, like Jojo, can get into some strange places. But we have Blacky that can help us find your Jojo."

"I'm sure," said Daniel hopefully.

"Is he neutered?" asked Dina.

"No! We are totally against it."

"Then we have some bad news," said Dina, "Unneutered dogs may tend to wander longer distances than neutered ones."

"I know," said Daniel concerned.

"We see," said Joab looking at the open Gazette again, "that Jojo has a rabies tag attached to his collar, "I hope you mentioned there also your address and phone number and that the tag isn't worn away."

The Science Fair

"The rabies tag is perfect, but regretfully still no calls."

"And his collar is the same as in the picture?"

"Yes, I think so."

"Has Jojo a microchip?" asked Joab.

"Yes, of course" answered Daniel, "I'll send you the chip number to your email ASAP."

"Thanks Mr. Cohen. But maybe there are houses in the neighborhood where Jojo sometimes spends his time or has a buddy he plays with during walks?"

"I don't think so," said Daniel, "Jojo is constantly under our control. We meet on walks other dogs, of course, with or without their owners but not somebody specific that I can remember."

"Have you notified your gardener and postmen, for example, about the lost Jojo and gave them a picture of him."

"We notified them and also our home maid and paperboy, garbage pick-up crews and others, of course, but most of them know him so they don't need a photo of him. We also asked municipal workers that clean the street and we even posted a picture on the grocery wall and also went to the local animal shelter, but as I said, regretfully, our efforts were limited and not too much sophisticated and that's the reason that we hired you."

"Does Jojo have some noisy toys he likes? Maybe a tin box for his biscuits, or something similar that makes a familiar noise? Dogs have a highly developed sense of hearing, you know..."

"Uhm, uhm, not noisy, though, but he has a toy bone he likes to gnaw at. Wait a minute kids," said Daniel.

He went upstairs and quickly returned with a blue rubber toy bone with remarkable gnawing marks on it.

"Please," he handed it to Joab who placed it in his pocket.

The Science Fair

"Maybe I miss something for now but I'm going to ask my wife and of course Tom, maybe he'll come up with something related to noises."

"Does Jojo have some unique identifying marks, like scars, color spots, etc.?"

"Let's see...uhm...he has a small white spot on his belly and a long scar inside one of his ears from a fight with a cat, you know, I don't remember which one, I'll ask Tom about it and notify you."

"Our advice," said Dina, "put your clothes, especially Tom's, out around your house. Not clean clothes of course. And if by chance Jojo is wandering outside near your home the familiar scent will drive him home. Besides, it'll be really helpful to have some of Tom's clothes with us."

"I'll do it," said Daniel hopefully and went to Tom's room and quickly returned with striped pajamas, jacket-and-trousers, and handed them to Dina.

"By the way," asked Dina with interest, "why you didn't hire a professional pet detective...I mean if Jojo is so dear to you."

"As a matter of fact we did! We hired the Science Gumshoes Detective Agency, didn't we?" said Daniel smiling.

"Thanks Mr. Cohen."

"When are you going to begin," asked Daniel.

"We are going to begin our search right away, this evening," said Joab looking at his watch.

"And where are you going to search?"

"First, in your vicinity, before we enlarge the search cycle."

"Good idea indeed," said Daniel "I understand that we have finished for now, "help yourself with the cookies and juice before you go.

Joab and Dina eat a few more tasty cookies and drank the sweat orange juice with enthusiasm and Daniel walked them to the heavy entrance door and opened it ajar.

"How much do you charge?"

The Science Fair

"Well...well..." stammered Joab, "we...we charge...we,"

"Then what do you say about 200 shekels-a-day plus expenses, this day is included, of course."

"You are...are...really kind Mr. Cohen," said Joab hesitantly while Dina was speechless.

Daniel took out from his pocket a brown elegant leather wallet and handed the surprised Joab and Dina one bill of 200 shekels and another of 100.

"That's your fee for today."

"Thanks a lot Mr. Cohen," they said in chorus.

Daniel took out from his pocket two visit cards and handed them one card each, "call me day or night if you have good or bad news."

"Sure."

"Good luck Science Gumshoes."

They shook hands again with Daniel and were soon on their way home.

Dina was silent whereas Joab was holding the pajamas hanged on his shoulder, whistling confused.

Where Is Jojo?

Joab and Dina live in Dimona - a little desert town in Israel.

Its population is 35,000 and is located 100 kilometers to the south of Jerusalem.

Dimona was founded in 1955 by the Israeli government in order to populate Jewish immigrants from all over the world.

The Dimona Nuclear Research Center is located not far from the town due to its relative isolation in the desert.

Most of the town's population makes a living by working in nearby chemical plants, Dead Sea tourist resorts and the nuclear research center.

When Joab and Dina arrived home, a dry, hot and dusty wind was blowing in the empty streets of Dimona. To their relief, they heard their Mom chatting with Danny's mother, which Joab and Dina disliked, in the living room because the terrace was out of the question for such weather conditions. So, they rushed undisturbed to the bottom of the garden and quickly shut the shed's door behind them.

"Biggie!" said Joab, "we have already made 300 shekels today and without doing much."

"It's a real miracle," said Dina revealing glittering metal braces on her teeth.

"And you suggested this stupid science fair of yours, ah..."

"You can't argue with success, can you?" said Dina joyfully.

"Then how on earth are we going to find this dog Jojo?" said Joab concerned.

"We have to prepare ourselves carefully for the mission," said Dina.

"Then tell us about it clever Albert."

"First of all, we'll need a powerful flashlight even if we have day light, sometimes pets hide in dark places."

The Science Fair

"I have one," said Joab. He got a long black flashlight from his toolbox, and placed it on the table with a thud.

"We'll need also a dog whistle," said Dina pointing to an almost ordinary looking plastic whistle, hanged by a thread on her neck.

"What's on earth a dog whistle?" said Joab feeling the whistle between his finger tips.

"Blow it."

Joab puffed up his cheeks and strongly blew the whistle. An almost unheard high-pitched sound reached his ears.

"Basically a dog whistle produces high-pitched sounds that are heard much better by cats and dogs than by humans. The faint high-pitched sound that you hardly heard is too faint for humans but for dogs it's very strong and therefore it's possible to attract the attention of a dog, in our case a lost one, from far away. And if we are lucky enough he may come to us wiggling his tail. Dog whistles are used for dog training, especially if one wants to control his dog from further distances than human yelling can reach and in a silent way without disturbing the neighbors."

"Wow!"

"Don't forget the pajamas."

"And the bone."

"Okay."

"I think it could be a good idea to take the little ones with us; they can help finding Jojo," said Dina.

"A good idea," agreed Joab, "That way Mom will not ask disturbing questions. I think I have seen Ami and Tammy playing in the playground and Hagary is watching TV."

"What about putting a few ads on the web before we start?" said Joab.

Dina nodded her head in disagreement, "a very bad idea Jobby, as more we postpone the search the slimmer are the chances to find Jojo alive. You must

The Science Fair

understand that he can go further or find himself in danger, so it's not the time to play with Facebook, let's go."

"Ok," said Joab, "I'm in charge of Ami and Tammy, the flashlight, the bone and the pajamas. The whistle is already on your neck and bring Hagary and Blacky with you and all of us are meeting ASAP on the pavement."

In a few minutes, the small troop passed by the large terrace where their mother was engaged in a laughing conversation with Danny's mother since the dusty wind went away.

"Where are all of you going?" said their mother suspiciously.

"We are going to the playground," answered Joab hiding the pajamas behind his back.

"Better than your stupid police games, enjoy yourself darlings."

"Thanks Mom."

"And come back soon."

"Yes Mom."

They heaved a sigh of relief and began their walk in the direction of Daniel's house not before hearing the annoying voice of Danny's mother behind their backs, "what need they the pajamas for and why is Joab hiding it behind his back in a stealth manner?"

"What pajamas?" said their mother.

"What, you are blind?" Danny's mother smirked at her pushing her nose forward laughing with pleasure. "I think your kids will never stop these foolish cops and robbers games of theirs. My Danny, for instance, is earnestly preparing for his science fair."

"Joab! Dina!" called their mother, but they have already vanished around the corner.

"Ufff...this awful woman is going to ruin our lives one day," said Joab worried, "we'll have to explain about this pajamas...and it was your idea to ask Daniel for it."

The Science Fair

"I bet you'll find a good excuse as ever," said Dina laughing.

"We have another twenty minutes before we arrive at Daniel's," said Joab looking backwards relieved to realize that the little were still walking peacefully behind them and Blacky was still heeling by Dina's left leg.

"If we find Jojo now, good for us," said Dina, "but if not, we'll have to prepare flyers and put them in mailboxes and post ads in... "

"Look," said Joab, "there are a few thousands of mailboxes in Dimona, and it's impossible to do it by ourselves in a reasonable frame of time, we'll have to hire somebody that's his job, we'll have to look in the Yellow Pages."

"But we'll have to pay, thickhead," said Dina.

"Don't forget that Daniel is willing to pay expenses, Din, Jojo means a lot to his son Tom."

"How could I forget this?"

"There are also two thousand PO Boxes at the post office building and as far as I know they can put our flyers in all of them immediately for a small fee."

"Good idea indeed," agreed Dina, "we'll have also to order big posters and post them on public billboards and on the web."

"And don't forget to remind us" said Joab, "to ask for a receipt whenever we pay for a service in order to show Daniel if you want us to be paid back for our expenses."

"Yes Sir!"

"And if Daniel pays expenses," went on Joab enthusiastically, "We can offer a really big reward for Jojo."

"I don't think that's a good idea, meathead."

"Why not clever Albert?"

"Well," said Dina, "a big reward can motivate people to scam us or ask for more and more or even worse - not willing to return such a valuable dog at all. I think one hundred shekels is a decent reward – the same as Daniel offered."

The Science Fair

"You are right again, Albert."

"If speaking about scams," said Dina, "then in our ads and flyers we should not disclose all Jojo's identifying marks since they are essential in order to verify that the caller has actually found the real Jojo and is not trying to scam us or playing tricks."

"You mean the white spot and the scar?"

"Exactly," said Dina, "nobody should know this beside us."

"But there is also the tag," added Joab, "we can also ask what address and phone numbers are engraved on it, can't we?"

"We can, of course, and we'll do it," said Dina, "but sometimes tags and collars are removed or got lost."

"And we shouldn't leave our names and address on the ads," said Joab, "for contact, phone number and email are enough. We don't need strangers in our or Daniel's garden bringing strange dogs for the reward."

"We'll have also," said Dina, "to go to pet shops, maybe somebody sold Jojo to them and we can buy him back."

"And also to the vet since people tend to bring lost or injured animals to him, don't they?"

"And to the shelters, and animal hospitals."

"And regretfully we'll have to approach road crews to see if they have, hopefully haven't, found Jojo's body," said Dina dabbing with one hand at her wet eyes with a tissue and with the other patting tenderly Blacky's back.

"Come on Din, don't be so blue, we are going to find Jojo alive, you'll see, I promise."

At this Dina smiled faintly.

"And don't forget to leave the chip number in all this places and check with them again and again daily or even twice a day if possible."

"We can also try," said Joab enthusiastically, "to place some announcements with Radio Dimona, I know they provide such services, for a fee of course."

The Science Fair

"And what about Facebook, Jobby?"

"If we share this on Facebook, sooner or later, all our friends and their friends are going to know that we are behind it, and we don't want to disclose this information, scams, remember? And besides, Mom and Dad you know...and also security concerns, remember."

"But you know that Facebook and Twitter are very popular and reach a very wide audience, maybe the widest possible, and Jojo might fall in real danger and we must hurry."

"Maybe," said Joab thoughtfully, "we'll need the help of auntie Bertha."

"You mean to ask her, for a favor, to use her accounts on our behalf since she has tons of friends and followers?"

"Why not Din?"

"But can we trust her?"

"Of course," said Joab, "she helped us many times in the past, and never told a word. So when she is contacted about Jojo I'm sure she is going to tell us ASAP."

"Maybe you are right."

"Here we are," said Joab pointing to a large house not far from where they were located, "It's Daniel's, let's start our search."

"Yes Sir!" said Dina laughing.

Joab and Dina gathered their little sisters and brother, gave each a large picture of Jojo and instructed them to look carefully around and to notify them for every small dog that resembles the picture.

"You too, Blacky."

Dina, kneeling, flung her arms around his neck and brought Jojo's rubber toy bone to his nose. She whispered in his ear, which always seemed very silly to Joab. Blacky sniffed the bone with interest for a while with quivering sensitive nostrils. Then he stretched his neck, sniffed at the earth and set off at a run.

The Science Fair

They searched the small streets, lanes and parks and peeped into yards. Dina was blowing the dog whistle from time to time, Joab was flinging Tom's pajamas over his head and all of them were calling for Jojo occasionally. Blacky disappeared for a few minutes and then returned sniffing the earth. After a while, the twins Ami and Tammy forgot their mission and enjoyed themselves in a small playground. Hagar was following Joab and Dina in her buzzing wheelchair showing Jojo's picture to Ruthy the doll.

A few dogs and puppies were attracted by the dog whistle and Blacky made friends with others and among them were also a few pinchers. A few of them were black others were brown and one was even beige but a closer look revealed that it was not Jojo.

After three hours of intense search, they began despondently their way home and decided to enlarge the search circle to other neighborhoods the next day.

They almost arrived home.

"What on earth is this?"

Joab pointed with a trembling finger at Hagar sitting in her wheelchair, with a beige small pinscher toying with Ruthy the doll on her lap.

Another Job

"We did it," said Joab poring over his laptop.

"Five hundred shekels each, wow!" Added Dina sipping her cup of tea, munching biscuits.

"Not bad for an one day Job," said Joab happily waving a fat bunch of bills in front of her face.

"Daniel is very kind," said Dina, "according to our agreement he had to pay us only two hundred shekels per day plus expenses which we haven't. Instead of two hundred he paid us in total one thousand."

"Good for him."

"But you have to admit that we were lucky," said Dina smiling, "without the help of Hagary who knows if we would be able to find Jojo."

"You are totally right," said Joab, "and it isn't for the first time. The same happened last year when she found the doll with the jewels for us."

"And that's the reason we'll have to buy her a present, she deserves it, doesn't she?"

"And what about Ami and Tammy?" Said Joab concerned.

"We'll have to buy them something too."

"well...well..."

"You stingy fellow."

Suddenly a message popped up at the right bottom corner of Joab's laptop screen.

"An email," said Joab browsing with anticipation.

Dina rushed to his side and bent over his laptop. "It looks like another Job."

"Somebody left his phone number and required to call him ASAP." Said Joab joyfully.

The Science Fair

"Then what are we waiting for?"

The elegant offices of Solar Deserts were located on the Center Mall's eighth store.

Joab and Dina were allowed inside by a polite uniformed guard who recorded their names and told them to present themselves at the reception desk that was placed in the middle of a wide hall furnished with good taste - high-tech style with clean lines and a lot of room.

"Yes, kids, what can I do for you?" A young elegantly dressed woman welcomed them.

"We have an appointment with Mr. Isaac Levi," said Joab hesitantly looking at Dina who was biting her nails nervously.

I guess you are Joab and Dina she said smiling and directed them to sit on a bench by the office of Mr. Levi and wait to be called in.

After a few minutes they were ushered inside by a good-looking secretary who asked them politely to sit down by a wide mahogany table facing a man about sixty, dressed in a gray business suite with a brown matching tie.

"Hi Dina, Hi Joab." he said beaming extending his right hand.

"Hello Mr. Levi," they said timidly in unison, shaking hands with him.

"I heard only good things about you."

They looked at him inquiringly.

"Let me explain." He said, "Daniel is my best friend and he told me about how you have excellently found Jojo, and as a matter of fact he has recommended you to do a little job for me."

Mr. Levi ordered cookies and juice and in a few minutes his secretary placed a big tray in front of them.

"Help yourself kids."

The Science Fair

Joab and Dina ate, sipped and looked hesitantly at Mr. Levi.

"Well, I need you to do a little job for me. But first, I would like to introduce ourselves. My name is Isaac Levi and I'm the CEO of Solar Deserts."

"What's a CEO?" Said Dina with interest.

"Well," said Mr. Levi, "CEO stands for Chief Executive Officer, in other words I'm running Solar Deserts."

"Thanks Mr. Levi."

"Solar Deserts is a renewable energy company," went Mr. Levi on, "I guess you have learned about renewable energy at school, haven't you?"

"Of course."

"In short, we develop energy crops to produce cheap ethanol fuel in order to replace polluting fossil fuel and by that to reduce greenhouse gas emissions that trigger global warming. I guess you heard the term energy crops."

"Like switchgrass," said Dina full of her own importance.

"Exactly," said Mr. Levi satisfied while Joab looked at his sister with admiration.

"And more to it," said Dina, "ethanol fuel can also substitute our dwindling fossil fuel reserves."

"You are really smart kids."

"Thanks, Mr. Levi."

"I guess you heard about photosynthesis at school."

"Yeeesss..."

"Then you know that by photosynthesis plants get their energy from the sun to build up their tissues."

"Yeeesss..."

The Science Fair

But regrettably only a small part of this solar energy that plants collect from the sun is converted into useful energy that plants can use, okay?"

"Okay."

"Well, basically what our company, Solar Deserts, has done is to improve significantly the ability of plants to receive and use energy from the sun, and by that with the same amount of water we get bigger plants and..."

"Much more ethanol," said Dina excited.

"I don't understand a word," complained Joab.

"Look Jobby," explained Dina facing him full of her own importance, "bigger plants have more biomass or material and from more biomass you can make more useful ethanol, got it?"

"Okayyy..."

"I couldn't say it better myself," said Mr. Levi satisfied.

"But how have you done this?" Said Joab with curiosity.

"Genetic engineering of course, thickhead," laughed Dina loudly.

"Ow!"

"Exactly smart children, genetic engineering is the answer. And more to it," went Mr. Levi on, "You must understand that the methods we developed to increase photosynthesis efficiency can be also used in agriculture to increase food crop yields as well. To sum it up, our science at Solar Deserts is a very important one with immense environmental, social and economic benefits."

"Then, you can be very rich," said Dina excited.

Joab gave his sister a cold scolding stare.

"You are right again Dina," said Mr. Levi with a serious expression on his face, "yes, our inventions can make many people very rich indeed and that's the reason we have lots of enemies. And here we come to the point, to your job, your attention please."

The Science Fair

"Okay."

"As I said," said Mr. Levi slowly emphasizing every word, "we have many enemies, and lately many unfavorable articles have been published against us in the Dimona Gazette and other papers across the globe as well and on the web of course, okay kids?"

"Okay Mr. Levi."

"Your job is to try to find out who those guys, that try to harm us, are and why they are doing it."

"Yeesss..."

"And since you are big experts on the web, use Facebook to befriend, Twitter to follow relevant people, browse the web, join forums and read papers."

"But excuse us Mr. Levi, why didn't you hire some real detectives or..."

Another scolding gaze.

"A very good question indeed," said Mr. Levi thoughtfully, "as a matter of fact we did, but they failed. We, at Solar Deserts, believe that in this case, young people can do better and they deserve a try, don't they?"

"Do you suspect somebody?" Asked Joab politely.

"As a matter of fact we do," said Mr. Levi resolutely, "We suspect Energy Castles whose offices are also located in this mall, a floor above us. We are going to sue them for this."

"Energy Castles?"

"Energy Castles develops solar energy technologies, especially solar power towers, let me explain: A solar power tower is a tower that has on his top a sunlight collector that collects the focused sunlight of large mirrors, then the heat created is used to heat water resulting in steam in order to power a turbine for electricity generation. Simple, no?"

"Very simple indeed, like using a magnifying glass to burn things." Said Joab.

The Science Fair

"Exactly Joab, quite simple," said Mr. Levi, "but can they compare this primitive technology of theirs to ours which involves genetic engineering and photosynthesis manipulation, can't they?"

"But why do you suspect those...those energy...energy...uhm..."

"Energy Castles Jobby."

"It's almost obvious," said Mr. Levi, "that the material published against us hints clearly to it. It's almost always against us and favors them. Have a look."

Mr. Levi opened a smoothly moving, almost unheard, drawer, and placed on the table a copy of the Dimona Gazette with a few bookmarks stuck between its pages. He opened it, then he reversed the gazette and pushed it towards them across the table. "Read please."

=====

By John Black, science correspondent

At the renewable energy conference held in Jerusalem Mr. Isaac Levi, CEO of Solar Deserts, a renewable energy enterprise located in the high-tech park near Dimona, announced an important scientific breakthrough in ethanol fuel production.

According to Mr. Levi, Solar Deserts has improved photosynthesis efficiency ten times more by using genetic engineering techniques - an unbelievable scientific achievement. The meaning is the possibility to produce high quantities of ethanol using different energy crops at lower cost than any other known renewable energy technique.

Researchers at the Desert Research Center maintain that to their opinion, improving photosynthesis efficiency by such high rates is impossible and they suspect that the research at Solar Deserts is heavily biased.

Moreover, they advise investors better to invest in solar energy serious enterprises like Energy Castles and others that look more practical and promising.

=====

The Science Fair

After a few minutes, Joab and Dina raised their heads and looked inquiringly at Mr. Levi.

"Well Kids, what do you think?"

"You made your point," said Joab, "it really looks like you have some enemies."

"We plan, in the near future, to open our gates to the public and skeptical scientists to visit our facilities and test our genetic engineered plants for ethanol production and refute all the claims against us."

"Good idea," said Joab.

"I'll send you a few links with similar materials to your email, and I'm sure you can google yourselves to find more information, can't you?"

"Can we see some of your plants and visit your place?" said Dina hopefully.

"For now, regretfully not," said Mr. Levi, "you must understand that our inventions involve big scientific achievements and we can't compromise them or our investments till when we are granted a patent, then everybody will be invited to witness our achievements, especially you."

"What a pity," said Dina disappointed.

"Daniel told me that you charge two hundred shekels per day plus expenses, don't you?"

"Well... yes...no...that's right Mr. Levi," said Joab.

"Well," said Mr. Levi, "the present job is much more complicated than finding cute Jojo, isn't it?"

"We believe so," said Joab.

"Then," said Mr. Levi, "We are going to pay you four hundred shekels per day plus expenses, what do you say, guys?"

"You really don't need to, it's too...mu..."

"Ouch! You stepped on my toe!"

The Science Fair

"We are going to meet every Friday, at my offices here, till you finish your job, to get your weekly report and to pay your fee, of course, agreed?"

"Agreed."

Mr. Levi escorted them to the door, "I would like to see your famous Blacky one day kids, I heard a lot about him."

"With pleasure Mr. Levi," said Dina, proud, "we'll bring him along next week."

"I'm looking forward to it."

"By the way," something suddenly crossed his mind before saying goodbye, "have you registered to our science fair, have you seen the ads?"

"Yes...no...well...we'll register ASAP," promised Joab.

"Ah..." said Dina gaping, "And I was wondering from where 'Solar Desert' is so familiar to me."

"Cheers."

"Goodbye Mr. Levi."

The Chess Competition

"We are on the right track," said Joab, "four hundred shekels per day plus expenses, if only Nir and the guys from the club will know."

"Don't forget," said Dina, "that in order to get the big money we'll have to report to Mr. Levi every week and show him what progress we have made and after our first report he's going to fire us for sure. Frankly, Jobby, I don't have any idea how we are supposed to discover who wrote those malicious articles against Solar Deserts."

"Easy as ABC," said Joab.

He opened the Dimona Gazette copy, that Mr. Levi gave them, at the bookmarked article, and hold it with his two hands open in front of his eyes.

"We can google 'solar deserts' together with some negative words from this article like...like...'impossible', 'suspect', 'biased', and add more like 'fraud', 'scam', etc. and a lot of relevant articles will soon come up."

"No doubt that articles will come up that way but how we are supposed to know who wrote them. They use aliases and hide their identity, you know."

"You have a point here," admitted Joab unwillingly.

"And don't forget that our job is to find not only who wrote those articles but also why he did it, and the 'why' could be much more tougher."

"Then what are we supposed to do?" said Joab concerned.

But to their rescue came Joab's mobile that was suddenly alive.

"Vow!"

"What's the matter?" said Dina bored, knowing that her brother's "vows" not always were a great deal.

"We can make another great buck, Din."

The Science Fair

Dina became worried knowing, from her experience, that this could pose more trouble for her.

"Have a look," said Joab pushing his mobile into her face.

=====

Enter the great chess simultaneous exhibition.

Famous Grandmaster David Shmilovich will play against fifty testers simultaneously.

Awards: still alive after 25 moves, 500 shekels; a draw 1000 shekels; a win 3000 shekels.

In order to be accepted, more than chess basics are required.

For registration contact chess@solar-deserts.com and leave your details.

The competition is sponsored by Solar Deserts, a leading renewable energy start-up located in Dimona, Israel.

=====

"Oh...Solar Deserts again," said Dina annoyed.

"What's wrong with this?"

"They are throwing around money like mad people, Jobby, it's a little bit suspicious, isn't it?"

"So what," said Joab, "they want some good public relations like every big company, don't they?"

"I've a bad feeling," said Dina worried, "that we are too lucky with easy money recently - yesterday for finding Jojo with no effort at all and today Mr. Levi and Solar Deserts throw hundreds of shekels in order to hire two children playing cops and robbers stupid games, isn't it strange enough?"

The Science Fair

"But maybe we are talented detectives with some reputation and fame, and we deserve every shekel we are paid to think and solve problems, think about it this way."

"Laugh Out Loud."

"In any case, one thousand shekels more won't hurt," said Joab excited.

"Only in case you beat that chess Grandmaster...ha-ha-ha..."

"Why not, Din, if not the first prize then maybe the third - 500 shekels are also a decent buck, aren't they?"

"Okayyy..." said Dina relieved knowing for sure that she was not a chess player of even of little merit, so she needed not to bother too much about this since they are not going to accept her to the competition anyway.

"But you yourself said that Mr. Levi's job is a tough one and probably he is going to fire us after our first report, so we need some other source of income, and this chess..."

"You are totally out of your mind if you think that you can beat Grandmaster Shmi...Shmi...whatever..."

"But, it doesn't matter at all if we beat him or not." said Joab.

"I don't understand, Jobby."

"Look," Joab explained, "we were assigned a mission by Mr. Levi to find out who is behind those negative articles, yes?"

"Yes."

"And we reached a deadlock, didn't we?"

"We reached."

"When a detective is reaching a deadlock, he can sniff around days without any results. In this case, a good detective shoots in all directions possible in order to accomplish his mission, even if sometimes, at first glance, it looks silly but suddenly

The Science Fair

in the end... presto, a good clue, and the mystery is unexpectedly solved, believe me. I read a lot about it, it happens all the time."

"Sure! It happens all the time," smiled Dina, "but not to us."

"But let's be serious for a while, we have a good reason to join this chess competition since it's sponsored by Solar Deserts and maybe, who knows, this will disclose some new leads. Maybe we'll see somebody suspicious, a fresh idea, something..."

"But you are dreaming, Jobby, if you think that you can play chess at a reasonable level in order to be accepted to the competition."

"I can't," agreed Joab with a mysterious tiny smile on his lips.

"Then who can?" said Dina amused.

"Well...well...who...who," stammered Joab for a while, "you!"

"Ha-ha-ha..." laughed Dina heartedly, "You are out of your mind Jobby, aren't you?"

"Not at all."

"You are joking."

"Nope."

"Then give us a hint, clever Albert," said Dina in disbelief.

"I spoke today with Professor Spike, who helped us with the orchids last year, remember, and for your information he's also a retired chess grandmaster, and we have an appointment with him..."

"Any chance to make myself a joke." Said Dina angrily.

"Have you forgotten our job at Solar Deserts?"

"I haven't forgotten a darn thing," said Dina, "and as a matter of fact it will be really nice to meet Professor Spike again but why me and not you, for example....ah?"

"Well...well...Dinny...because you once played chess at school, don't you?"

The Science Fair

"For God's sake, Jobby. I played only a few games and besides the basic moves, I really don't know anything about chess."

"The basics are enough, Din, didn't you read the ad?"

"The ad says clearly more than the basics," protested Dina.

"It's the same, Din. Trust me."

"You always have some good answers to trick me into trouble," protested Dina, "like the private math lesson...and how much I suffered...you brat."

Joab barely choked his laughter.

"Never again!"

"Don't worry, be happy," said Joab joyfully.

"From my experience with you, I really have to worry about this chess contest."

"You are like the dog from the joke auntie Bertha told Grandpa," said Joab laughing.

"And this reminds me that I haven't seen Blacky for awhile...Blacky!...Blacky!"

Blacky replied with a harsh bark, from their garden, and Dina faced Joab relieved, "the joke with the dog Jobby."

"Auntie Bertha's joke goes like this: John said to George that Mr. Brown's dog plays chess well and George replied that he doesn't because he, George, beat him three times...ha-ha-ha..."

"If so" laughed Dina, "maybe the best solution is to sand Blacky to the chess competition."

And he's going to do better than you...ha-ha-ha..."

"We shall see who has the last laugh," said Dina offended.

Joab glanced at his mobile, "We have to move, Professor Spike is waiting for us in a half of an hour at Rita's coffee shop."

"Yummy...yummy..."

The Science Fair

"But we have a little problem," said Joab on their way out.

"What exactly?" said Dina worried again.

"Well...well...I invited Professor Spike to the coffee shop."

"So, Jobby?"

"Some...somebody has to pay for it...no?"

"And you of course don't have a dime in your pocket as ever, do you?"

"You are right again," said Joab barely choking a high-pitched laughter.

What is a Chess Opening

When Joab and Dina walked into Rita's coffee shop, it was filled with the pleasant smell of baking. It was almost empty. Only one familiar person was sitting at a table in a corner - Danny's mother. She was sipping coffee and reading the paper.

Joab and Dina ignored her and sat down at their regular table. They were very hungry and waited impatiently for Rita to emerge from behind the counter.

The unexpected newcomers disturbed Danny's mother's reading, and she scowled at them.

Rita, a fat woman of about forty, emerged from behind the counter with a big white baker's cap on her head.

"Hi, Guys!" she welcomed them with a broad grin. "You came at just the right time. The brownies just came out of the oven."

"Wonderful! We're starving," Dina said. "Two brownies and a glass of orange juice for each, please."

"Immediately!" Rita disappeared behind the counter.

Dina smiled to herself.

"What's so funny Din?"

"Imagine you are playing chess with the dog that plays chess and lose...ha-ha-ha..."

Danny's mother took off her glasses and scowled at them again.

A few seconds later, Rita reappeared with a big tray. She put four steaming brownies and two big glasses of orange juice with long straws on the table.

"Bon Appetit!" She disappeared back into the kitchen, her heavy body shaking from side to side.

The Science Fair

They finished the first brownie in a few big bites then sipped through the straw, the juice making a loud gurgle. Danny's mother yanked off her glasses, flung the paper on the table with a thud.

"I've got to talk with their mother!"

But they were very hungry and finished the second brownie, leaned back in their chair, and licked their icing-coated fingers in total contentment. Joab glanced at his watch and then at the front door. Professor Spike should be there any moment.

Dina looked out of the corner of her eye at Danny's mother, but the woman was not showing any signs of leaving. Then her wink met Joab's concerned face since he hoped for a private meeting at least not with the presence of this annoying woman who can tell their mother that they met with Professor Spike arousing the usual suspicions that they are playing cops and robbers again.

"Anything else?" Rita appeared again from behind the counter.

"No...nothing..." But that wonderful aroma! "Well, maybe...maybe another brownie and some more orange juice."

"Coming right up."

Rita came out from behind the counter and put two brownies and two big glasses of orange juice on the table in front of them.

"Are you also planning to make a buck at that chess tournament," said Rita with curiosity.

"Who is also in the run?" asked Joab with interest.

"A lot of people, I think," replied Rita.

Danny's mother took off her glasses, stuck out her nose and glared at the surprised Rita. "If you don't mind Rita, my son Danny is one of them and he has the best chances of beating Grandmaster Shmilovich, he is so talented and he's practicing chess with a private tutor, a real grandmaster, for a few months now, if you don't mind."

The Science Fair

"One may think that he's at least Bobby Fischer..." Rita's whole body shook with laughter.

"If you think that's funny I'm leaving!" She left a bill on the counter and stomped out of the shop.

"Grown-ups can be such fools," Rita said with a sigh. "This stupid chess match has driven the whole town crazy. It's unbelievable. Enjoy your brownies, kids."

They had not taken the first bite when Professor Spike, a young good-looking man about forty, rushed in beaming and sat across the table.

"Hi kids."

"Hi Professor Spike."

Professor Spike ordered a cup of strong black coffee and smiled at them. "Well kids, how can I help you?"

"Well," Joab said, "We wonder if a weak chess player can beat a strong grandmaster."

"I bet you have plans of beating GM David Shmilovich," smiled kindly Professor Spike at them.

"Yes...no...yesss..."

"By the way, what is GM?" asked Joab politely.

"The initials of 'GrandMaster', meathead."

"Dina is a GM of sorts," laughed Joab aloud pointing at Dina.

"Well," said Professor Spike, "It's almost impossible under normal circumstances to beat a GM, but under unnormal circumstances, in rare occasions, it could be possible. Sometimes duffers succeed."

"What's a duffer?" said Dina with interest.

"A duffer," explained Professor Spike "is a slang word for a weak chess player. Okey kids."

The Science Fair

"Joab is a duffer," laughed Dina pleased pointing at him with her index finger.

Joab delivered a sharp blow with his elbow.

"Ow!"

"You said something about unnormal circumstances, Professor Spike, didn't you?"

"Oh yes kids, for example in a chess simultaneous exhibition, or a simul in short, like the coming one with Grandmaster Shmilovich, when a strong chess player, the exhibitor, plays against many players for many hours sometimes fatigue takes its toll and he can lose his concentration and make mistakes."

"Then we have a chance," Joab said satisfied.

"It's not so simple kids," smiled Professor Spike, "even if Shmilovich is going to make mistakes you shouldn't, otherwise he is going to win."

"Then we don't have any chance," said Dina relieved.

"It depends," said Professor Spike thoughtful.

"Biggie!" exclaimed Joab looking satisfied at his disappointed sister.

"In order not to make mistakes, at least not at the beginning, you'll have to learn by heart a few chess openings, kids."

"Chess what?" said Dina worried.

"A chess opening," said Professor Spike, "is a set of the beginning moves of a chess match. I'm sure you heard about the Sicilian Defense, English Opening or the Queen's Gambit."

"Noooo..."

"Never mind. In short, we can say that the best way to begin a chess game in order to reach a better position and win at the end is to follow some known chess moves that have been already researched in the past by many chess enthusiasts and professional players, and instead of inventing the wheel you can drive the car."

The Science Fair

"Ah..." said Dina gaping, "only now I understand what our chess guide at school meant...you can learn a few good moves by heart and instead of thinking hard about what your next move should be, you have it ready in your mind."

"I couldn't have said it better myself," smiled Professor Spike at her, "that's exactly a chess opening."

"You see, you see," said Joab joyfully, "how easy it is to win."

"My goodness!"

"But, it's not as easy as it looks at first glance, kids," smiled Professor Spike, "in a chess match we have two players and the chess opening that you know by heart maybe your opponent also knows."

"If so," said Dina, "we have to do our homework and learn by heart an opening that the other player doesn't know."

"Wonderful, Dina."

"And more to it," said Professor Spike, "you must understand that we have two players in a chess match and the opening is decided by the moves done by both of them. You can try, of course, to push the game towards your desired opening by your moves, but your opponent can try the same - to push towards his preferred opening by his moves. In many cases, you begin one opening and in the end you can find yourself playing another."

"Then," said Dina worried, "I understand that one opening is not enough and a good chess player needs to know many openings by heart."

"You are right again," said Professor Spike satisfied.

"So," said Joab, "If Dina will learn a few openings by heart she can beat Grandmaster Shmi...Shmi..."

"Why me and not you clever Albert," protested Dina with an angry look in her eyes, "and besides, his name is Shmilovich if you don't mind".

"Well kids," said Professor Spike sipping from his hot steamy coffee, "you must understand that no matter how many openings you are going to learn by heart

The Science Fair

Shmilovich knows more of them. Besides, openings are not everything in chess and after a certain number of moves, the opening ends, and you are on your own against Grandmaster Shmilovich and at that stage your chances to beat him are very slim, even much better players than you can't."

"But you said..."

"What I said is that if you are lucky enough kids, and if Grandmaster David Shmilovich will play his favorite opening which you'll prepare for beforehand and if he's going to stick to it to the end and if you'll follow suit accurately, then you have some chances to survive more than 25 moves and get the third reward, but to win..."

"Too many 'iffs,'" smiled Dina.

"You are right again," agreed Professor Spike, "And if you are more than lucky, take in account that the exhibitor will be very unpleasantly surprised to find that after some twenty moves he has achieved nothing at your board and sometimes he will propose a draw to be rid of such a troublemaker and concentrate on other games. And you are going to accept his proposal, of course, what could bring you the second prize."

"And if the exhausted Shmilovich, from hours on his feet, will commit some mistake and lose his Queen for example, maybe you can do more, but as I said, the chances are very very slim."

"Beginners luck," said Joab smiling.

"Recently we are really lucky," added Dina pleased, "especially with money."

Joab gave his sister a cold scolding stare.

"Then why not try the lottery kids?" smiled Professor Spike.

"But seriously," went on Professor Spike seeping again from his coffee, "you must know that not everybody is admitted to a simul against a chess grandmaster. You need some chess record and rating, but since this event is meant for chess promotional among kids you have some chances to be admitted."

The Science Fair

"We don't worry about that, we can speak with Mr. Levi," said Dina assured of herself.

"You know Mr. Levy, the CEO of Solar Deserts?" said Professor Spike surprised.

"Yes, we..."

Joab suddenly had a dreadful fit of coughing.

"By the way, if speaking about Mr. Levi and Solar Deserts," inquired Professor Spike with interest, "have you registered to his science fair, kids?"

"No." Said Dina, "but we'll do it today."

"Very well, kids."

"And besides," went on Professor Spike, "don't forget that in a chess simul the exhibitor plays in white in all the games and the individual participants, like you guys, play in black. So, take in consideration that you should prepare for the relevant openings for the black and not for the white."

"Thanks, Professor Spike."

"Now listen to me carefully," went on Professor Spike seriously, "there is another option, it's called..."

"Hippopotamus Defense!" exclaimed Dina full of her own importance.

"Eh..." exclaimed Professor Spike startled.

"Well, I did my homework," said Dina proud of herself.

"Then, clever Albert, tell us about this hippo...hippo...whatever..."

"Well," began Dina while the skeptical Joab and the surprised Professor Spike were listening intently, "the Hippopotamus Defense is an irregular chess opening in which the player in black moves his pawns to the third rank creating a pawn raw."

"I don't understand a word!"

The Science Fair

"The Hippopotamus Defense," said Dina enthusiastically, "is a very obsolete chess opening and almost not used in today chess and therefore it can surprise Grandmaster Shmilovich, and if I'll research it carefully...maybe...maybe..."

"Biggie...Biggie!"

"So," said Professor Spike looking at Dina with admiration, "you are some expert on chess, aren't you?"

"For she's a jolly good fellow...For she's a jolly good fellow..." Joab hummed joyfully.

"Now guys," went on Professor Spike smiling, "it's time for hard work. The simul is in two weeks time, the time is short, and the work is big. First of all you'll have to find out Shmilovich's preferred opening or openings, if you chose this option, or to study carefully the Hippopotamus Defense or both. All the information you need is free on the web. You can play online chess against the computer by level and desired opening."

"And we'll have to practice many hours a day," added Joab excited.

"We...ah?"

"Well..." said Joab in order to evade Dina's anger, "What's exactly a blind simul, Professor Spike?"

"A blindfold simultaneous display is when the exhibitor plays blindfolded and does not see any of the chess boards, but retains all the moves of the games in his head. Regular boards and pieces are used, but the moves are communicated verbally by the exhibitor and the players."

"How possible?"

"The blindfold simul chess exhibitors," explained Professor Spike, "besides knowing their chess they are endowed by the developed ability to carry out visual operations in their mind and a lot of practice, of course."

"By the way," added Professor Spike with interest, "the ordinary simul world record was achieved when the exhibitor played against 500 opponents whereas the blindfold record was set at about 50 opponents."

The Science Fair

"And Who is Bobby Fischer?"

"Robert Fischer was a Jewish American chess Grandmaster and World Chess Champion. He is widely considered the greatest chess player of all time.

"In 1972, he won the World Championship from Boris Spassky of the USSR in a match held in Reykjavik, Iceland, that attracted more worldwide interest than any other chess match ever."

"Good for him!"

"Another boy asked me the same questions, as you, only yesterday, "said Professor Spike with interest, "maybe you know him, maybe he's a friend of yours? But regreftfully, I don't remember his name."

"How he looks like?" asked Joab worried.

"Ehm...a squat boy with thick glasses, do you know him?"

"It's probably Nir," said Dina.

"Exactly," agreed Professor Spike, "now I remember, the Inspector Amos' son, the guy from the police club, like you Joab."

"And, Professor Spike," said Joab politely, almost begging, "what advice did you give him?"

"The same I gave you a moment ago, I guess."

Joab asked anxious, "is he aware about the Hippopotamus Defense?"

"Of course, Jobby."

"Oh my God!" exclaimed Joab alarmed, "we must be one little step ahead of Nir and the guys from the club! Let's go Din, we have to hurry."

"Wait...wait a minute," reminded Dina, "we still have to pay the check."

"It's okay kids," smiled Professor Spike kindly, "I've already settled the matter, it's okay."

"Thanks a lot Professor Spike for your kindness."

"Welcome, kids, only success."

The Science Fair

What is Photosynthesis

When Joab and Dina walked through the kitchen door, breakfast was already on the table. Hagar in her wheelchair was feeding Blacky furtively with pieces of her omelet under the table, the twins were engaged in a usual noisy brawl and their father was absorbed in his morning paper, as always, during breakfasts.

Their mother welcomed them beamingly and they took in silence their places around the table.

After a few minutes when breakfast was in full blast, Joab said hesitantly, "what is this photosynthesis about, Mom?"

Their mother, who was a teacher at the local educational farm, put the milk she was holding on the table, stared at him in surprise, her hands on her hips, and said pleased, "Very nice, Jobby, what a wonderful question to start our morning with...well..."

"Photosynthesis Mom."

"Yes...photosynthesis is a process used by plants and other organisms to transform light energy captured from the sun rays into energy utilized by plants to fuel their activities and growth, okay?"

"Okay."

"Basically, plants collect the sunlight energy and use it to create, from water coming from the soil and carbon dioxide, or CO₂, coming from the air, organic compounds like glucose that nourish the plants. And as a very important by-product, of this process, is also emitted oxygen back into the atmosphere."

"Now I understand where all the oxygen comes from," said Joab knowingly.

"And why we shouldn't destroy the rain forests," added Dina excited.

"Exactly kids," said their mother satisfied, "and more to it: photosynthesis is probably the most important natural process on earth and a very complicated one."

The Science Fair

"Wow!"

"At first glance, sweeties, it doesn't look like photosynthesis deserves a loud 'wow', but you must understand that without it there would be very little food on Earth, because there wouldn't be plants and all of us, including animals, will die."

"Then I don't understand something, Mom."

"Yes Jobby."

"It's clear, Mom, that antelopes eat grass and other plants in order to live, isn't it?"

"Of course my dear."

"So it's clear that antelopes will die without photosynthesis because of lack of plant food."

"Yes Jobby."

"But a lion, for example, doesn't need photosynthesis at all because he eats meat and not plants, does it?"

"Laugh out loud!"

Joab brought his foot down with great pleasure on Dina's toes.

"Ow!"

"Joab has a point," said their mother, "A lion is a meat eater, of course, what we call a carnivore, but in order to eat an antelope, for example, first, the antelope needs photosynthesis in order to have plants to eat then grow and be eaten by the lion in the end. Therefore, it's clear that the lion will also remain hungry without photosynthesis, and not only the antelope. As a matter of fact, photosynthesis is the source of life for nearly all plants and animals on earth."

"The food chain...the food chain," exclaimed Dina excited.

"Exactly." said their mother satisfied, "the food chain, when one species eats another, in a specified order, and all begins with photosynthesis."

The Science Fair

Their father folded his newspaper on the table and said smiling, "even when we go on a trip we have to thank photosynthesis."

"Eh...how comes?" said Joab skeptical.

"It's obvious thickhead," taunted him Dina laughing again.

"Then tell us clever Albert."

"Didn't they teach you at school?"

"No..."

"Broadly speaking, Jobby, fossil fuels like coal, petroleum, and natural gas were formed mainly from prehistoric plants and animals, that lived hundreds of millions of years ago, which were buried for millions of years under thick layers of mud, rock, and sand and slowly, because of lack of oxygen, decomposed into organic materials and formed fossil fuels in the form known to us today. And of course those plants and animals needed photosynthesis, for food, in order to thrive and end as a fossil fuel. So Dad is right that we have to thank photosynthesis again."

"Then what you say is that we have to thank the dinosaurs for our gasoline?" Joab said.

"Many believe," said Dina, "that fossil fuels are the remains of dead dinosaurs. In fact, most of the fossil fuels we find today had been formed millions of years before the first dinosaur appeared on Earth. Got it?"

"I can't say it better myself," said their father satisfied.

"And what is photosynthesis efficiency, Mom?" said Joab.

"Where did you here this?" said their mother with curiosity, "it's not something you were supposed to learn at school, is it?"

"Well...we...we..."

"Dinny!"

"I really...really...we..."

The Science Fair

"Don't tell me you are playing cops and robbers again." Said their mother angrily.

"No mom, of course not," promised Joab, "it's about a science fair project at school."

"That one sponsored by Solar Desert?" asked their father with curiosity.

"That's it."

"If so," said their mother relieved for now, "you must understand that photosynthesis efficiency is a quite complicated issue not so suited for a middle school project."

"Please."

"Basically, photosynthesis efficiency is defined as the part of the light energy that is converted into useful energy by plants, not wasted during the photosynthesis process, and is used by plants for their own needs and growth. In most of the cases photosynthesis efficiency is no more than 6%, meaning that at least 94% of the sun energy, available to plants, is wasted and not converted into useful energy."

"But how can we improve it?" asked Dina with interest.

"Why are you asking this sweetie?"

"Well...well..."

"The science fair project," smiled their father.

"Too complicated for a science fair project darlings."

"Please."

"If you are so interested...you probably heard about the chloroplasts at school."

"Of course."

"If speaking about plants," explained their mother, "the chloroplasts are small bodies, located in plant cells, especially in the leaves, and are responsible for the photosynthesis process. They capture and store the sun's light energy and use it to make food for the plants, or what scientists call organic matter like glucose, from water coming from the soil and from carbon dioxide coming from the air and release oxygen back into the air. Nothing new kids, okay."

The Science Fair

"Okay."

"All chloroplasts contain the green pigment chlorophyll that absorbs the sun's light energy and..."

"Now I understand why leaves are green." Said Joab.

"Good morning, thickhead."

"Ouch!"

"Is all this necessary, Jobby?"

"But she..."

"Well," their mother went on, "It's clear that in order to increase photosynthesis efficiency you have somehow to manipulate the chloroplasts, which are the photosynthesis factory, to produce more food available for plants from the same amounts of sun rays, water and carbon dioxide."

"But how is this possible, Mom?"

"The first method is to make the chloroplasts to collect more sun energy."

"How?"

"Well, you must know that plants are able to use only a small part of the spectrum of light in order to convert it to food, partly since leaves, because of the green chloroplasts, reflect back green rays of the visible spectrum and..."

"Then that's the real reason that leaves look green!" said Joab excited.

"Good morning again, meathead."

"Jobby, please don't do it again," warned his mother scolding.

"But she..."

"Therefore," went their mother on, "if we could manage somehow to manipulate the chloroplasts to be able to absorb more light wavelengths and more energy from the sun we can, of course, increase photosynthesis efficiency and food production for plants, what scientists call glucose or sugars. Okay kids."

The Science Fair

"And the second method, Mom."

"If the first method is about collecting more sun energy then the second method is about doing more with the same sun energy."

"But how?"

"Well, the chloroplasts need the sun's energy to split the carbon dioxide and water molecules to create from them new glucose molecules. If we could somehow manipulate the chloroplasts to need less energy, than now, for the creation of every new glucose molecule, we can have more nutrition food for the plants with the same light energy, water and CO₂ resources. Okay kids."

"Okay..."

"Another method is to manipulate plants in wasting less nutrition resources on general different internal processes that plants perform in order to maintain themselves."

"I have another method," said Joab triumphantly, all of them turned their heads waiting in anticipation.

"If we make the leaves of a plant bigger, then they are going to collect more energy from the sun, don't they Mom? Like bigger solar panels, I mean."

"Very good, clever Einstein," said Dina surprised.

"A very good idea indeed, Jobby," said their mother pleased, "but take in account that too big leaves can hide the leaves under them from the sun and what we win here we lose there."

"It didn't even cross my mind."

"But how can we do all these wonderful things and improve photosynthesis efficiency, Mom?"

"With genetic engineering, thickhead."

A scolding look.

The Science Fair

"Well, this is really complicated, Dina is right. With genetic engineering we can do all this wonderful things. You learned about genetic engineering at school, didn't you?"

"Yeeesss...well..."

"Genetic engineering," their mother explained, "is a science that enables us to change the hereditary features of plants, animals and even human beings."

"I don't understand a word."

"Well, let's take orchids, for example. You know orchids couldn't grow in our garden, because they are not fit for desert life, and..."

"Orchids are not endemic to the desert," Joab interrupted in a knowing tone.

"Exactly, Jobby," his mother said in amazement. "Orchids are not endemic to the desert. But, with the help of genetic engineering, we can change that, and maybe someday we'll have lovely orchids in our garden, who knows?"

"How comes?"

"If you really want to understand," said their mother, "you have to know something about genetics."

"Go on, Mom."

"All the plants, animals and human beings in the world are made up of very little cells that can only be seen under a microscope, okay?"

"Okay."

"Every cell has a nucleus - a central part - that holds the chromosomes. These chromosomes store the hereditary information that is responsible for the features of every living creature, like eye color, the length of your nose, Jobby, or maybe the height of a plant."

"Very interesting, indeed."

"The chromosomes are made up of a very important complex chemical known as DNA. The DNA molecules are arranged in different patterns, and that's what

The Science Fair

determines features. For example, one pattern could mean blue eyes and another pattern could mean green eyes. Okay?"

"The genetic code," said Dina eagerly.

"Exactly," her mother said, pleased. "A chromosome contains quite a lot of DNA, and therefore it's responsible for many features. But, the little bit of DNA in a chromosome that determines each individual feature is called a gene. In other words, the gene is the smallest unit of heredity."

"Jeans?"

"Not the kind you wear, Jobby." His mother smiled. "These genes are spelled differently: G-E-N-E. Playing with genes is what genetic engineering is all about."

"Now I understand," said Joab, excited, "why Professor Spike is so smart...he probably played with his own genes."

At that, Dina burst out laughing.

Joab yanked one of her plaits and Dina cried, struggling from his grip.

"What's gotten into you?" rebuked his mother.

"Genetic engineering, Mom."

"Genetic engineering doesn't work like that," she explained. "If you want to create a desert orchid, for instance, you first have to take a little cell from a plant that is endemic to the desert, say a cactus, and then extract from its chromosomes the right gene or genes that are responsible for the cactus's fitness for desert life, like its ability to thrive on little water with a lot of sun, and so on.

"Then you have to transfer those genes to the chromosomes of an ordinary orchid cell. Finally, you have to grow this new cell, and it begins to duplicate until we get a little sprout, and then a full-fledged desert orchid. That parent plant will reproduce, and so one day we'll have a new generation of desert orchids in our garden."

"And the same applies if we want to change some plant traits that will enable, at the end, the improvement of photosynthesis efficiency."

The Science Fair

"If so, I'm afraid, Jobby," said Dina, still laughing, "that it's a little too late for you to play with your genes and be smart."

"Wouldn't it be wonderful to improve the photosynthesis efficiency of some plants and win the upcoming science fair Mom?" Joab said, ignoring Dina's remark.

"I'm afraid you couldn't. Genetic engineering might sound simple, but the technique of transferring genes, and especially growing engineered plant cells, is very complicated and only specially trained scientists with very sophisticated expensive laboratory equipment can do it."

"Like Professor Spike?"

"Exactly, like Professor Spike, sweetie."

Their father folded his paper, placed it on the table before him and said, "The improvement of photosynthesis efficiency is good for everything, for example, we can grow crops with bigger and more nutritious grains and fight hunger all around the world."

"Then," said Dina excited "one day I'll be a famous genetic engineer and will improve photosynthesis efficiency in crops and sell them around the world and I will be rich with heaps of money and jewelry, and..."

"Ha-ha-ha."

"We shall see, Jobby. He who laughs last, laughs best," said Dina offended.

"And more to it," went on their father, "I guess we can use genetic engineering to improve photosynthesis efficiency and by that to produce bigger and much more developed plants and hence more ethanol fuel than it's possible or convenient today."

"Ethanol fuel is made from energy crops like corn and sugarcane," offered Joab in a knowing tone.

"Exactly Jobby," said their father satisfied.

The Science Fair

"And ethanol fuel is very important," suggested Dina full of her own importance, "since it helps us to reduce our dependency on running out fossil fuels and also to reduce carbon dioxide emissions that are bad for the greenhouse effect."

"I see that your school is not a total waste of time," smiled their mother.

"But how we make ethanol fuel, Mom?" said Dina.

"Ethanol fuel," said their mother, "is a renewable energy source because the energy is generated by using sunlight, which cannot be depleted. Creation of ethanol fuel starts with photosynthesis done by energy crops such as sugarcane or corn. In the photosynthesis process is produced glucose that is stored mainly in plant cells and especially in the chloroplasts and other cell organelles.

"Basically, Ethanol is an alcohol-based fuel made by processing these energy crops - fermenting and distilling their glucose."

"But, it's not as simple as it looks," added their father.

"What do you mean by that, Daddy?"

"Well," explained their father, "the resources needed for growing energy crops like corn and sugarcane are arable land, water, fertilizers and pesticides all of whom are not limitless, so we shall come very soon to the dilemma of..."

"Food versus fuel," interrupted Dina triumphantly.

"Well...well...Dina," smiled their mother and added, "this dilemma could be avoided, of course, if we improve photosynthesis efficiency and develop plants, by using genetic engineering, that can thrive on little water and grow on arid sites, tolerate diverse climate conditions and different soils and are easy for cultivation. In this case, the meaning is that only small agricultural resources will be used for growing energy crops and food stock yields won't be affected. You see kids, genetic engineering can help us to achieve a win win situation."

"Win...win...what?" said Joab.

"The meaning is that you don't need to trade off food crops for energy crops, you can have both of them, thickhead."

The Science Fair

Joab ignored the teasing comment since something urgent crossed his mind, "Mom, can switchgrass do the trick?"

"Well...well...well," Theodore, did you hear this, said their mother satisfied facing their father.

"Switchgrass is a good candidate, of course," said their father, "it has some promising features since it's a low-cost and low-maintenance harvest and if its photosynthesis efficiency is going to be improved significantly, then its biomass will increase meaning more leaves for example, and of course more ethanol fuel could be produced, from sugars or glucose stored in its chloroplasts, with the same input.

"Ethanol fuel can also be made from the fibers of trees and grasses like switchgrass what scientists call 'cellulosic biomass'.

"Cellulose is the most abundant component of plant biomass - leaves, stems, and stalks - because it is the main component in plant cell walls."

"Yes...this cellulosic ethanol offers promise because cellulose is very abundant and we can use the whole plant biomass and not only the parts that contain sugars. And some grasses and trees like switchgrass are very cheap and easy in cultivation and do not need as much water as corn and sugarcanes for example."

However, till now no good method was invented to efficiently break down plant cell walls, which are mad mainly of cellulose, into sugar and the sugar into cheap ethanol."

"By the way, isn't cellulose also used in making paper?" said Joab.

"Yes darlings, cellulose is used for making paper, insulation of buildings and more."

"Do you have switchgrass at the farm, Mom?"

"We have two experimental plots belonging to Solar Desert," said their mother, "If you're good maybe I'll take you with me one day to see them, if I'll get their permission, of course."

Joab winked at Dina meaningfully.

The Science Fair

"Wait a minute, where, on earth, did you two hear about switchgrass?" said their mother suspiciously.

"Mr. Levi he..."

Joab suddenly had a dreadful fit of coughing.

"How many times do I have to tell you not to wolf down your food? You are going to choke some day. And you," said their mother, glaring at Dina, "what are you so pleased with yourself for? Your plate is still full. You haven't eaten a thing...yes, Dina, where on earth, did you two hear about switchgrass and Mr. Levi...ah?"

"It's about our science fair project, Mom," answered Joab quickly.

"I'm smelling that somebody is playing cops and robbers again..."

"It's our science fair project idea...we..."

"Theodore, you have to put your foot down with these two bandits. Theodore, do you hear me?"

Joab sank back down onto his chair, and to hide his embarrassment he bit into Tammy's toast.

Tammy began to scream.

"Is that really necessary, Jobby?"

"I'm sorry," he said, rapidly spreading jam on another piece of toast for his sister.

"I have heard about a chess competition for kids," said their father with interest.

"Dina is going to register," announced Joab proud of his sister which looked paler than ever.

"A better idea," said their mother satisfied, "than playing those stupid police games again, bravo Din!"

"Woof! Woof!" barked Blacky from under the table.

Sniffy

Dina sat sweating in front of her laptop wiping her shining forehead with the back of her hand.

What a horrible life, she was thinking. How is she going to face Grandmaster David Shmilovich if she is beaten even by the first level of this dreadful chess computer? Again Joab has tricked her against her will into his childish games...the same as with the private math lesson the last vacation...and how much she suffered then...and she is going to suffer much more at this chess competition...Don't worry, be happy...ah...you little brat.

Joab suddenly opened the door of the shed, "What's up with your chess?"

"Terrible," said Dina anguished wiping her forehead again, "and everything because of you...brother."

"I'm sorry Din," apologized Joab, "but we need to jump in the cold water."

"Cold!" protested Dina smiling, "freezing! Brrr..."

"Why don't you take a break and have some tea and biscuits," suggested Joab on his way to their kitchenette.

Joab and Dina set by their table sipping hot tea and munching biscuits.

"This horrible chess," heaved Dina a sigh sipping from her tea.

"Come on, don't be so blue."

"It's obvious that this chess business of ours is going nowhere," said Dina heaving another sigh, "but worse, how on earth are we going to find out who are the enemies of Solar Deserts?"

"Don't worry, be happy," smiled Joab mysteriously.

"Oh...don't say this stupid slogan of yours again."

"Trust me."

The Science Fair

"Don't you think that you are over loaded with your stupid self-confidence," protested Dina, "I tried Google and it's not a big deal to find articles, blog posts and talkbacks against Solar Deserts, but how are we supposed to know who stands behind them - aliases, anonymous posts, you know."

"Maybe you didn't look in the right places," said Joab.

"Then tell me, clever Einstein."

"Besides Google there are also other search engines like Bing, Yahoo and many others and thousands of local search engines as well; we have also Facebook, Twitter and Google Plus and heaps of other social networks."

"You are crazy!"

"Not everything you can get for free by search engines in the open, sometimes you have to pay for information. There are also free and subscription public records and databases maintained by governments and private agencies, phone listings, newspaper archives, state archives, property records, driving license records, email address databases, court records, occupational licenses, etc.

"And don't forget that Hebrew is not the only language on the globe, we'll have to look for information in English, Chinese, Spanish, German, Russian, Japanese, Arabic, Rumanian..."

"Please stop it! stop it!" pleaded Dina squeezing her head temples between her open palms, "this infinite blah blah gives me a real headache. Stop it!"

"It's only a joke," Joab could not contain himself and let out a loud rumbling laugh.

"And a bad one," smiled Dina back.

"But seriously," she went on, "How on earth are we supposed to do the job? You'll better forget about the money..."

"There are ways," said Joab mysteriously.

"Yes, Albert."

Joab was swinging his smartphone in front of her eyes for a while.

The Science Fair

"I don't understand, do you mean to call somebody for help, maybe a real detective agency."

"Come on, Din, we can do better than that, don't you think so?"

"I really don't understand," shrugged Dina her shoulders.

"What are cellular phones used for nowadays, besides speaking of course."

"Well, well..." was Dina thinking aloud, "I know... to SMS."

"And what more, thickhead?"

"What more...what more...for applications?"

"Good morning, applications of course." said Joab satisfied.

"I don't understand. Do you have some application that will do the job for us?" said Dina in total disbelief.

"Yes, I do!"

"Nonsense, Jobby like all your gibberish."

"Really?"

"Well?"

"The application is called The Sniffing Dog, best known, by us at the Police Club, as Sniffy."

"Sniffy, what a ridicules name," said Dina patting Blacky's back with affection, "and besides dear chief inspector, Blacky is the best sniffing dog in the world, isn't he?"

"Of course he is."

"But how on earth this Sniffy of yours works?"

"It is a kind of an artificial intelligence software, I mean it thinks more like a human than as a machine. It mines information from all around the web like Google, blogs, social networks and different databases, in all relevant languages. A chore impossible for human beings."

The Science Fair

"No one knows it better than me," smiled Dina.

"And more to it, since Sniffy scans also phone directories, and mobile phones are connected to GPS, and everybody carries a smartphone, even auntie Bertha, then well... it can locate dangerous people and warn us."

"Dangerous?"

"Come on, it's only a saying."

"You guys bought The Sniffing Dog?"

"Of course not, it's not for sale."

"Then how on earth have you got it...I mean it looks quite an expensive device, not for kids at a stupid police club."

"Well," said Joab ignoring his sister's remark, "some high-tech rich guy developed it and in order to test it, he let us use dear Sniffy for a while. It is in the beta phase."

"Beta phase?"

"Before a commercial software program is released to the public, it usually goes through a beta phase. During this stage, the software is tested, by suitable people, for bugs and errors in order to improve it before it is released on the market."

"So, you are lucky guys at the police club, I only hope you didn't pilfer it from inspector Amos as you and Nir, his son, have done with the electronic surveillance device last vacation, remember?"

"Of course not, I promise."

"Then how are we going to use it?" asked Dina with interest.

"Easy as ABC," said Joab punching quickly his mobile keypad while Dina was watching with interest. "Now let's test Sniffy."

=====

Test Mission 1

Target: Joab Golan, Oasis Street 36, Dimona, Israel

Information type: negative

Alerts: threat level, threat identity, threat proximity

Range: 50 meters

Enter

=====

After a few seconds, links pointing to various Facebook unfavorable posts about Joab appeared on the phone's screen, obviously posted by Dina and then:

=====

Alert:

Threat Level: very low

Threat identity: Dina Golan, Oasis Street 36, Dimona, Israel

Threat proximity: 3 meters

Coordinates: 31°3'N 35°1'E

=====

They both laughed for a while and Joab said joyfully, "from now on beware what you are writing about your beloved brother. Big brother is back!"

"But what's the meaning of 'threat level', 'threat identity', 'threat proximity', and 'Range: 50 meter,'" asked Dina with curiosity.

"'threat level' is to what extent you are dangerous, and 'low level' means that you are just a mere nuisance."

"Very funny."

"'Threat identity' is our request to get the real identity of the author of a malicious article even if he uses an alias, a hacker or spammer as well. 'Threat proximity' and 'Range: 50 meter' is when somebody suspected as a threat comes closer to us than

The Science Fair

50 meters, then we are warned about him. We can extend and shrink the range at our will, of course. Isn't it wonderful Din?"

"And that's because mobile phones are connected to GPS, and because everybody carries a smart phone it's possible to snoop after almost everybody, isn't it?"

"Exactly, Din."

"Sniffy is special in this that he understands 'negative' as we understand it," explained Joab full of his own importance.

"I don't understand a word, Jobby."

"Usually the word 'good' means something positive, of course, but sometimes also the opposite - something negative."

"How comes, Jobby?"

"When Mom says 'you are good kids', sometimes she really means that we are good, when for example, she says it with a pleasant tone after we have helped her with the little ones."

"Seldom happens," said Dina smiling.

"But when Mom says the same "you are good kids" with a gruffly tone, shocking her head from side to side, she means to say that we are as a matter of fact bad, especially when she says it after we haven't helped her with the dishes."

"That's the usual," smiled Dina again.

"Now I understand, the meaning of artificial intelligence...for a machine 'good' is really 'good' and 'bad' is really 'bad', but for our Sniffy 'good' can sometimes also mean 'bad', like real people think, taking in account situations, tone of speech and body gestures that a machine cannot interpret correctly in order to understand reality."

"Exactly Din."

"Then Sniffy is a machine with a human brain, isn't it?"

The Science Fair

"You are right again," said Joab satisfied, "and more to it, the online translation services translate as the same level as you play chess...ha-ha-ha...it's like a gibberish, whereas Sniffy translates brilliantly..."

"I suffer and you laugh."

"Come on, it's only a bad joke."

"I forgive you this time."

"Well...oh...yes...but Sniffy translates like any other biggie professional translator."

"I bet he does."

"Now let's assign Sniffy his first real mission."

=====

The Sniffing Dog

Mission 1

Target: Solar Deserts, Inc. Dimona, Israel.

Information type: negative

Keywords: switchgrass, photosynthesis efficiency, genetic engineering

Alerts: threat identity, threat proximity

Range: 1000 meter

Enter

=====

"It'll take Sniffy sometime to give us good information, only goodies will be delivered to us while useless material will be filtered out."

"We'll wait and see," said Dina skeptical though Joab demonstrated that it works only a few minutes ago.

"Now, let's test Sniffy's data mining abilities," suggested Joab.

The Science Fair

"Data mining?"

"Data mining," said Joab, "is the automatic extraction of useful information from databases, like the web, by employing artificial intelligence methods."

What is Switchgrass

In order to test Sniffy's data mining abilities," Joab said, "Let's read the Wikipedia article about switchgrass and then compare it to what Sniffy can do for us, agreed?"

"If you say so."

After poring almost an hour over their laptops, Dina straightened her aching back and said, "what a long and boring article, with so many queer words, I don't understand a word, and you?"

"Well," agreed Joab, "I thought it would be much more simple, but don't worry, be happy. We have dear Sniffy, haven't we?"

"We have."

"We can ask Sniffy to summarize this article for us focusing on our investigation needs."

"Then what are you waiting for, go on. Give him a try."

=====

Mission 2

Data mining target: <http://en.wikipedia.org/wiki/Switchgrass>

Information type: abridged

Keywords: energy crop, genetic engineering, photosynthesis efficiency

Enter

=====

Joab and Dina waited a few minutes for Sniffy, to do his job, sitting by the table sipping hot tea and eating cookies and biscuits while Blacky was lying down panting, his tongue hanging out while both his back legs were spread on one side of his body as German Shepherds do.

Their laptop screen went suddenly alive.

=====

Note the highlighted passages!

What is Switchgrass?

Switchgrass, is a perennial (a plant that lives for more than two years) warm season grass native to North America, where it occurs naturally from Canada in the north southwards into the United States and Mexico.

It is used for soil conservation since its deep root system (up to 2 m) is excellent for holding soil in place, which helps prevent erosion. It is used also for forage production, as an ornamental grass, and more recently as an energy crop for ethanol fuel production.

Switchgrass is a tough, deep-rooted, plant with short rhizomes (a subterranean thickened, storage stem of a plant) that begins growth in late spring. It can grow up to 2.7 m high and the leaves are 30–90 cm long. The scarlet-orange flowers are small and grouped together in a column called a panicle, which is located on the ends of the long stems. The panicles could be 30 cm long.

As a warm-season perennial grass, most of its growth occurs from late spring through early fall; it becomes dormant and unproductive during colder months. Thus, the productive season in its northern habitat (Canada) can be as short as three months, but in the southern reaches of its habitat (Mexico) the growing season may be as long as eight months.

Switchgrass has two distinct forms: the lowland cultivars, which tend to produce larger plants and more biomass, and the upland cultivars, which are generally smaller and less coarse than lowland types.

Switchgrass as an Energy Crop

Switchgrass photosynthesis process is efficient, giving it an advantage in conditions of drought and high temperature.

The Science Fair

Switchgrass is both a perennial and self-seeding crop, which means farmers do not have to plant and reseed after annual harvesting. Once established, a switchgrass stand can survive for ten years or longer. Unlike corn, switchgrass requires relatively modest levels of chemical fertilizers. Overall, it is considered a resource-efficient, low-input crop for producing energy from farmland.

Switchgrass is a versatile and adaptable plant. It can grow and even thrive in many weather conditions, lengths of growing seasons, soil types, precipitation, and land conditions.

Switchgrass can be grown on land considered unsuitable for crop production, including land that is too erodible for corn production, as well as sandy and gravelly soils in humid regions that typically produce low yields of other farm crops.

Switchgrass has been researched as a renewable energy crop since the mid-1980s, because it is a native perennial warm season grass with the ability to produce moderate to high yields on marginal farmlands. It is now being considered for use for cellulosic ethanol production, biogas production, and direct combustion applications.

The main advantages of switchgrass as an energy crop are its stand longevity, drought and flooding tolerance, resistance to many pests and plant diseases, relatively low herbicide and fertilizer input requirements, ease of management, hardiness in poor soil and climate conditions, and widespread adaptability in temperate climates.

The main advantage of using switchgrass over corn as an ethanol feedstock is its cost of production that is generally about half that of grain corn, and more biomass energy per hectare can be captured in the field. Thus, switchgrass cellulosic ethanol should give a higher yield of ethanol per hectare at lower cost than corn.

Switchgrass can be pressed into fuel pellets that are subsequently burned in pellet stoves used to heat homes (which typically burn corn or wood pellets). Switchgrass, in pellet form, has been widely tested as a substitute for coal in power generation - a development that can significantly reduce greenhouse gases.

Scientists discovered that switchgrass stores more soil carbon than its competitor for ethanol production, corn. Studies show that a greater abundance of deep roots

The Science Fair

under switchgrass acts to increase soil carbon levels. Boosting carbon storage in the soil mitigates the greenhouse effect further and improves soil quality.

Many scientific efforts, employing genetic engineering, were made in the United States, China and other places in order to improve the conversion of switchgrass cell walls (cellulose biomass) into sugar and the sugar into cheap ethanol fuel, but as for today, all those efforts failed.

=====

After an half of an hour, Joab and Dina straightened their backs.

"Much better," said Dina relieved.

"And much clearer and shorter," agreed Joab, "Sniffy explained some difficult words in parentheses and highlighted important issues for us."

"And it is also focused on energy production, photosynthesis and genetic engineering as requested," said Dina.

"Now it's clear," said Joab, "why Solar Deserts try to engineer switchgrass for fuel ethanol production."

He read aloud the highlighted passage:

"Switchgrass photosynthesis process is efficient, giving it an advantage in conditions of drought and high temperature."

"Because switchgrass is the easiest to further improve upon and is suitable for desert life," said Dina.

"And I bet," added Joab, "that they are using for this the lowland cultivars which tend to produce larger plants and more biomass."

"But I don't understand why Sniffy highlighted the word 'China' in this article."

"It's really a mystery," Said Joab, "But if there is something, we'll know soon."

Joab read aloud the last clause:

"...but as for today, all those efforts failed."

The Science Fair

"But maybe somebody, in the mean time, did it." Dina said.

"Let's find out."

"I don't understand."

"Well," said Joab, "Mom said that Solar Deserts has some switchgrass at the farm. Let's have a closer look."

"But Mom said that we have to ask for their permission," protested Dina.

"Come on."

"But we were hired by Solar Deserts," Dina argued again, "not to snoop after them but rather to snoop after who snoops after Solar Deserts, weren't we?"

"A good detective has to shoot in all directions."

At the Farm at Night

That evening, about eight o'clock, Joab and Dina sat on their front stoop stairs as a light fog drifted over the lawn.

Joab was thinking that it would be much more fun to go to the farm at night when no one was there rather than wait to go with their mother. Besides, they would have to uproot and take with them at least two switchgrass plants, one ordinary, from the control group and the second from the genetic engineered experimental group.

"It's time to do a little sleuthing at the farm, Din."

"After all, tomorrow is another day."

"But the brain and owls work better at night," smiled Joab.

"Then we'll have to hurry up." Dina looked concerned at her mobile's time display. "And we'll need to come back ASAP, before Mom and Dad start looking for us."

The farm was located not far from their neighborhood, so they set off on foot with Blacky prancing happily after them. After about ten minutes, the silhouettes of the buildings appeared out of the misty darkness.

Joab and Dina quickened their pace and in a few more minutes reached the fence.

"We have to watch out for the night watchman," Dina whispered and sent a worried glance at Blacky, who looked quite calm.

The pale moon cast just enough light for them to locate quickly a big gap in the fence.

"We can go through here," Joab whispered. "It's-"

"Grrrrr," Blacky growled suddenly.

"The watchman is coming!"

Frightened, they hid behind a big bush. They peered for a while from behind the leaves and twigs but could not see anything.

The Science Fair

"It's safe," Dina announced when Blacky suddenly stopped growling and began licking her hand.

They slid quickly through the gap.

All of a sudden, someone grabbed Joab's shoulder.

"What on earth?" he exclaimed, frightened.

But it was only the barbed wire fence.

They moved in silence, taking care not to step on dry twigs or leaves. Joab checked his pockets for his mobile, flashlight, screwdriver, big pliers and a small trowel for digging around the plants in order to uproot them carefully, and finally ensured that the binoculars and camera were still in place on his neck. Dina from time to time glanced worriedly at Blacky that was heeling beside her.

They passed the fragrant flowerbeds and stepped out onto the main path, flanked on both sides by big pepper trees that cast black shadows on the grass.

They went on, not making a sound.

The moon was reflected in the glimmering windows of the greenhouse.

"That's where the orchids were last summer, remember?" Dina whispered with a shudder, pointing to the long, silent building as Joab returned a satisfied controlled chuckle.

"I hope," went Dina on concerned, "that this time it'll be better."

"Sure!"

And since Blacky was totally calm and relaxed, it was clear that nobody is around, even not the Bedouin (people that wandered the desert) watchman which gave them a hard time last time they where there.

"I think," said Dina in silence pointing forward, "that the switchgrass plots are there, where the tall pines are, you see."

They reached the pines and a few meters away was located a small plot populated with dense green vegetation looking in the dark closer to black than green.

The Science Fair

Joab switched on the tiny powerful LED flashlight and they were able to see a big sign: Switchgrass Control Group.

"Here we are."

"The control group is the ordinary switchgrass Din, isn't it?"

"Of course thickhead."

The bright light beam traveled around. The small plot was crowded with plants about 40 cm high with elongated leaves and thin stems. The slim plants were swaying gently in the light wind.

Joab picked out the small trowel from his crowded pocket, "what lucky we are that it's the beginning of the growing season and the switchies are still small."

"What on earth, Jobby?"

"We need a little switchie in our garden, needn't we?"

"But it's theft." protested Dina.

"Only meaningless pilfering."

"Laugh out loud."

"Be serious for a while."

"I was sure that you only meant to see them and maybe take a picture, didn't you?"

"Come on," said Joab crouching and digging carefully around one of the switchgrass plants, "who is going to notice? It's only a simple stupid useless grass. Hold the flashlight for me please."

After a while, they were able to remove the plant with some roots and rhizomes - the thick stem of some plants that grows underground and has roots and stems growing from it.

"Done."

"We'll have to hurry up," said Dina, "take in account that the plant is uprooted and we'll have to plant it back into soil and gave it water ASAP."

The Science Fair

Joab switched off the flashlight and they went to the second plot located some distance away from the pines with the calm Blacky trudging after them in complete silence. Joab carried carefully the switchgrass plant.

Here waited for them another sign: Switchgrass Experimental Group.

Joab switched on the flashlight again. Here the plants were sparsely scattered with small signs stuck by them in the soil. The plants were taller, about 70 cm high, with longer leaves and much more thicker strong stems than the plants in the first plot.

"Wow, these plants are much more developed than those," exclaimed Dina excited pointing to the first plot.

"Genetic engineering did the trick, thickhead," smiled Joab in the darkness.

"Hold the flash light for me," said Joab and after handing it to her, he snatched out from his pocket the trowel again.

"Oh, my! What on earth Jobby, you are out of you mind. These ones are not simple stupid useless grass. As a matter of fact, they are very expensive genetic engineered plants, that's a daylight theft Jobby and not pilfering."

"A nightlight theft," laughed Joab loudly.

"Shhh...somebody is going to hear us," said Dina concerned.

Joab crouched near a nearby plant and began digging with the trowel again.

"They are going to take us to the police and I am going to spend all my life in jail because of you."

Joab stopped digging and looked amused at his sister, "Be serious, Dinny. Nobody is going to put in jail two cute kids because they harmed some grass."

"But this is not a simple grass, you know it."

"But they don't need to know what we know, do they? For two innocent kids grass is always grass," said Joab and went on with his digging.

"I hope you are right," said Dina worried.

The Science Fair

The second plant took more time to remove since it had bigger roots and Joab had to dig more around it in order to remove it safely.

"Oh...what's this?" said Joab surprised.

"Oh dear, it's an underground irrigation pipe, you broke it."

"Not a big deal," said Joab relaxed, "this happens every day. This kind of plastic pipe is easy to fix. At least the tap is closed."

After ten minutes, of digging and panting, the engineered plant was removed. It had bigger and denser roots, bigger rhizomes and was much heavier than the ordinary switchgrass plant.

"Dear switchie," kissed Joab the plant eagerly in the darkness.

"At last you have a love affair, Jobby."

Joab shook out his clothes, checked that all his tools were safely placed back in his swelling pockets; Dina was satisfied to see that Blacky was rubbing his body against her left leg relaxed, and they began their way back in silence, carrying carefully two precious plants.

"Grrrrr," Blacky growled suddenly.

"The watchman is coming!"

Frightened, they hid behind a big bush. They peered for a while from behind the leaves and twigs but could not see anything.

Suddenly Joab's mobile vibrated in his pocket. He took it out quickly, "It's Sniffy, look!"

Dina read in dismay:

=====

Mission 1

Alert:

Threat level: second-degree

The Science Fair

Threat identity: unknown

Threat proximity: 600m to the south

Coordinates: 31°4'N 35°2'E

=====

"Let's get out of here ASAP," said Dina frightened.

"We are lucky," said Joab relieved "Our way home is in the opposite direction, and it's only a second-degree threat, let's go."

"I don't understand," whispered Dina worried.

"A first-degree threat could be very dangerous."

"Oh my God!"

"Grrrrr," Blacky growled again.

"Stop it!" ordered Dina and he obeyed rubbing again against her left leg, "good dog."

Before they reached the gap in the fence on their way home, Joab said, "Let's wait behind this bush and see what happens."

"You are totally crazy, they are going to catch us with the plants and put us in jail."

"Come, be serious, and don't forget that we have Blacky with us," said Joab and the three of them hid behind a thick bush peering in the darkness.

After a few minutes, in silence, Sniffy went alive again and indicated that the threat was only 200 hundred meters away.

"Shhh..." They huddled together and could even hear each other breathe.

Suddenly from the darkness appeared a few silhouettes moving in the direction of the switchgrass plots.

Joab aimed the binoculars and adjusted the image dials.

"What a pity that we are not closer, maybe we know somebody," said Joab disappointed, "what a shame that Sniffy didn't tell their identity."

The Science Fair

"Better this way," said Dina heaving a sigh.

Suddenly light went on and the engineered switchgrass plot was illuminated for a while and a few figures were seen clearly.

A loud hiss of water was heard from the direction of the switchgrass plot accompanied by an angry voice, "somebody broke the pipe, how many times I warned you people to be more cautious."

"Everything because of you," said Dina worried.

The light was switched off.

Suddenly Sniffy went alive again.

"Nir is around," said Joab looking surprised at his mobile.

"If it's only Nir then we can relax," said Dina looking suspiciously around. "No wonder that Blacky is wagging his tail, he knows him."

"A good thing to have Sniffy," said Joab, "We could be warned of our buddies."

"But don't forget that Nir has Sniffy too and he also knows about us."

"It didn't cross my mind," said Joab punching his forehead with his fist.

"But what is he doing here, at the middle of the night?"

"Probably he was also hired by somebody or by Mr. Levi himself, like us."

"But why Sniffy thinks that he is a threat?" said Dina.

"Maybe Sniffy went crazy," said Joab.

"But maybe not."

Suddenly the light was switched on again but this time not in a continuous regular way but short pulses of light went on and off for a few minutes.

"Eh...what's this?" said Dina behind the bush holding Blacky much closer than before.

The Science Fair

After a few minutes, the lights were switched off, the voices ceded and the silhouettes vanished in thin air. Silence again.

They remained huddled behind the bush for a few minutes more and when Sniffy indicated that the threat was gone and Blacky was completely relaxed, they began quickly their way, in silence, home.

After they passed through the gap again Joab said, "We'll have to ask Professor Spike why the light went on and off many times. It's really a mystery."

"Maybe it's some kind of damage to the lights," suggested Dina, "don't you remember that last winter the lights went on and off many times at home?"

"Possible," said Joab, "but better to ask somebody. And don't try Mom, she'll get very nervous."

"And she has all the reasons," smiled Dina in the darkness.

Energy Castles

It was a midsummer nice day when Energy Castles opened its gates to the public for a free guided tour of its facilities.

Mr. Levi the general manager of Solar Deserts hired Joab and Dina to conduct an investigation in order to discover who is writing harmful articles about his company and he was suspicious especially of their chief competition, Energy Castles, in developing new renewable energy methods of production.

Joab was here because of the detective job they had to do but for Dina it was more a day off after long hours of chess practice frustration.

This time, they were without Blacky, which waited patiently outside the plant because dogs, regrettably, were not allowed inside.

The fifty people that joined the tour were welcomed at the gate of the facility by a young steward who led them to a long table full with tasty cookies and refreshing drinks which Joab and Dina enjoyed very much.

There were present a few people they knew like a teacher from their school and even Mr. Daniel who hired them to find JoJo and a few others but they preferred to ignore them since they were not here on a social mission.

After a few minutes appeared their guide, a nice young woman, and asked for attention. She said that everybody must wear hardhats and protective sunglasses that will be supplied before the tour begins.

Suddenly, Nir appeared grinning out of the blue, "Hi guys, interested in solar energy...eh?"

"Well," said the startled Joab, "it's a good way to prepare for the upcoming science fair."

"Don't fool me around," said the squat Nir smiling smugly behind his thick glasses, "I know you guys, you probably have something on your mind, some new mystery to solve, I think. Tell me that I'm not right."

The Science Fair

"Regretfully, this time you are wrong," smiled Dina back.

"Then what have you done at the farm in the middle of the night...ah?"

"Well..."

Suddenly Danny's mother came along accompanied by her son. Danny's mother was a tall arrogant woman and Danny was a lanky diligent quiet boy.

"How's going with your science fair project guys?" Danny's mother said with interest

"Wonderful," replied Nir uninterested.

"And what's your science fair idea?" asked Danny's mother facing Joab and Dina.

"Ethanol fuel," replied Joab shrugging his shoulders.

"Almost everybody does this hot topic hopping to win, but what exactly Joab and Dina."

"About swit..."

"Ow!"

"Well," went Joab on after Dina was silenced, "It's not so wise to disclose the idea, is it?"

"Any case, good luck to you all," Danny's mother said pushing her nose forward, "I'm sure Danny will win an award this time, I'm right Danny?"

"Yes Mom."

After everybody was supplied with hardhats and dark sunglasses, they proceeded to a veranda overlooking the facility.

The tour guide introduced herself, asked for silence and said:

"First of all you are allowed to freely take pictures on this tour; there are of course other places, on this facility, that this is not allowed, there you'll see the warning signs.

The Science Fair

"Before I begin I have a question," she said looking forward, "Do somebody knows who was the first one in history to use solar energy in a powerful way?"

"Archimedes with the mirrors," shouted somebody.

"Right," said the guide, "Archimedes, the renowned mathematician, was said to have used a large number of mirrors as a weapon in 212 BC, when Syracuse, his hometown, was besieged by the Romans and as a result the Roman fleet was supposedly incinerated by the mirrors, though eventually the city was taken and Archimedes was slain. This was of course a legend but it showed that solar energy was regarded powerful and potent from antiquity. And even the concept of using mirrors for producing energy is not new. Let's begin."

Energy Castle was founded three years ago by a group of investors from Israel. Our main objective is to produce cheap electricity from solar energy in order to replace depleting and contaminating fossil fuel, as all of you know. This plant is experimental so it is very small relatively to some practical plants we already operate."

You can see the solar power tower, impossible to miss, its height is around 100 m. We use an array of flat, movable mirrors, called heliostats that are scattered in front of the tower, to focus the sun's rays upon a collector or the 'target' that basically works like this of a solar water heating system and is located on the upper part of the tower."

Basically, these focused sun rays are used to heat water up to 500 °C in a huge boiler placed under the target, and the resulting steam is used to power a turbine that is coupled to a generator which produces electricity."

This plant employs thermal storage to store heat, accumulated during day time, in molten salt containers, to continue the producing of electricity also when the sun is not shining."

Sun tracker control systems are used in order to determine the best mirror or heliostat array positions in order to focus the sun in the most efficient way onto the target."

The heliostats or mirrors are quiet big, about one meter high and three meters wide."

The Science Fair

Besides the many pros of such facilities there are also some cons like vast land needed in order to deploy the mirrors and maintenance needs to keep the plant running like replacing broken and damaged mirrors and rinsing them with water in order to remove dust that prevents good sun reflection."

But nevertheless, we believe that our method of generating solar energy electricity is the most viable option for the long run not only for power plants but also for traffic propulsion."

Yes...Before we begin our tour, questions please."

A tall mustached man with a white large cap and a binoculars and camera hanging on his neck said: "Do you suggest equipping cars with mirrors, on top, in order to create heat that will somehow power car engines free from the sun?"

"Maybe one day, but take in account that for the visible future electrical vehicles will be the answer for traffic propulsion. Three main types of electric vehicles exist, those that are directly powered from an external power station like electric trains and busses and here our advantage is clear since we can supply electricity directly; those that are powered by stored electricity, like batteries, that could be charged by us; and those that are powered by hydrogen fuel cells that in order to produce the hydrogen needed you need steam at high temperatures which is a direct product of ours used also to power turbines for electricity generation.

"But isn't ethanol the real future fuel?" The tall mustached man went on in an assertive manner.

"Don't forget," said the guide, "that even ethanol fuel production requires energy that we can supply directly from the sun at low cost."

"But what if photosynthesis efficiency is improved very much then, for example, cheap and abundant switchgrass, that grows everywhere under almost any conditions, could be used, in the form of energy pellets, to heat boilers and create steam to power electricity turbines instead of your enormous, expensive and clumsy mirror fields."

Joab and Dina exchanged meaningful glances and pricked their ears hearing this.

The Science Fair

"Wonderful," the guide laughed clapping her hands amused, "there is an urban legend running around about fantastic photosynthesis improvements of switchgrass from 6 to 60 percent, it's a bad joke circulated by Solar Deserts. We also conduct some extensive experiments with switchgrass but what they claim it's impossible."

Suddenly Joab's cellular was vibrating and when he looked furtively at the screen Sniffy was alive sending an alert meaning that a dangerous unidentified first-degree threat is probably in the crowd. He prodded Dina gently with the elbow and pointed in silence to the screen.

They were looking suspiciously around but most of the people looked quite peaceful. Maybe it is the tall mustached man with the white large cap that asked the tough questions? In most of the cases, spies try not to attract attention unless it is a way to trick people to think the opposite. Even his binoculars and camera were meaningless since a lot of people, in the crowd, carried this gear with them, including Joab. And even if he is so knowing, then what? And what about Daniel, the man who hired them to find Jojo. A farfetched possibility.

But since they were not alone they didn't worry much.

"Look!" whispered Joab into Diana's ear using his closed palm to engulf his mouth in order to muffle his voice, "Nir is also looking furtively at his cellular."

"No wonder. He has Sniffy too, and he's also alerted of the danger like us. He's like a sticky shadow."

Joab nodded his head in agreement.

The tour went on undisturbed. The guests were walking between the huge mirror fields getting information and asking questions. They approached the tower to climb it up with the elevator to have a closer look at the boiler and the 'target' and watch and photograph the mirror fields from above.

The guide warned them to wear the provided protective sunglasses since as the higher they go on the tower and closer to the target, the stronger the sun is concentrated, from hundreds of mirrors, and it could be dangerous to the eyes.

The Science Fair

Suddenly the loudspeakers yelled, "Attention please, a big black German Shepherd entered unauthorized our facilities. We believe, according to information we have from the gate security man, it belongs to two kids, a boy and a girl. They are required to take him right now. He wanders around behind the tower, a few hundreds of meters away."

"Wow! It's Blacky," uttered Dina concerned.

Joab put the binoculars to his eyes, adjusted the image dials, and scanned the terrain ahead of them.

"See anything?"

"He is there, let's go Din."

They moved quickly behind the tower and called Blacky which was playful that morning and disobeyed their orders.

"Blacky Bad dog! Heel boy!"

"I'll teach him a lesson," said Dina angrily.

Blacky wandered further and they ran panting after him for a while until he lay down, wagging his tail playfully.

Dina reprimanded him for a while and they started their way towards the gate to leave Blacky outside again and come back, maybe time remained to catch the lift up the tower with one of the last groups.

On their way back they passed by a small plot of familiar plants.

"What's this?" Said Joab startled, "isn't this switchgrass, Din?"

"Wow, it is!"

Joab picked up his camera from his pocket...

"What on earth are you doing, don't you see the sign?"

"What sign, Din?"

"This one," said Dina pointing to a big white sign with red bold letters.

Photos are Forbidden

Joab ignored his sister remark and took a few photos of the switchgrass plants from different angles.

"Oh my God! We are criminals!"

"Show me one low," said Joab holding up a finger to help him make his point, "that says that two cute kids are not allowed to take pictures of some useless stupid grass, I am right Blacky?"

"Woof! Woof!" barked Blacky joyfully.

"You see."

"But there is a sign!"

"But we don't know to read," shrugged Joab his shoulders.

"They are going to put us in jail."

Joab Dropped to his knees and began quickly digging around the roots of a plant with his bare hands.

The Chess Simultaneous Exhibition

The Dimona cultural center is a big square building coated with marble and big shining panes that reflect the sun and shadows casted by a few nearby trees. The building is surrounded by pedantically pruned hedges, flowerbeds, ornamental trees and fragrance smells of a fresh mowed lawn fills occasionally the air.

During the year, the cultural center hosts education, arts, sports and hobby classes for children and adults alike.

This morning the center hosted the long awaited chess simultaneous exhibition that was scheduled to take place in the large lobby of the building.

In the middle of the lobby were placed long desks and chairs in a square and on the desks were fifty chessboards with the white and black chess pieces in place. A few rows of chairs were available for the audience.

As ten o'clock in the morning was approaching, the hall was buzzing with players, guests, friends and family of the competitors.

"Hi Joab and Dina," said Nir, beaming.

"Do you also participate?" asked Dina with curiosity.

"As a matter of fact, no."

"Then what are you doing here, you are not some kind of chess freak, are you?" inquired Joab suspiciously.

"Well," said Nir, "to be honest with you guys, I'm sniffing around."

"Sniffing on what?" asked Joab concerned.

"Don't tell that you two came here to play chess, don't play the fool with me!"

"As a matter of fact," said Dina, "I came to play chess."

"You? Jobby, tell me it's not true."

Joab nodded his approval.

The Science Fair

"I'm sure that you enrolled for this chess contest but only as a pretext to camouflage some clandestine activity of yours, don't you?"

"I don't understand what you are talking about." Said Joab.

"It would be much more beneficial to join hands," said Nir hopefully.

Joab wanted to say something when auntie Bertha appeared from nowhere, "well...well...well...who we see here?"

Aunt Bertha was a small energetic woman about sixty. She was in red - her hair was dyed red, her lipstick, clothes, shoes and handbag were also in red and a big red pipe was stuck between her lips.

"Hi auntie Bertha." Said Joab politely.

"Don't tell me," said Dina surprised, "that you came along to play chess."

"Yes I do, Kids. When I was young I used to play a lot of chess and even with some success, you'll see."

"And how do you plan to beat Grandmaster David Shmilovich, if I may ask," said Joab with interest.

"Over the years, I developed my own tactics," said Auntie Bertha smugly, "if not to beat him then at least to survive 25 moves."

"Like what exactly, auntie Berthica, please?"

"Hi, darlings, Hi Bertha," said suddenly their Grandfather and Grandmother.

"Hi Grandma...Grandpa..."

Their Grandfather and Grandmother kissed them on their forehead and Grandmother said, "I hope you came here to play."

"Dina is the one," said Joab.

"Bravo Dina!"

Dina heaved a sigh.

The Science Fair

"Chess is a really educational game," said their Grandmother encouraging.

"They don't need any educational games," smiled their Grandfather, "all what they need is the prize, isn't it kids?"

"Some extra cash won't hurt," smiled Joab.

"Mom and Dad are not around," said their grandmother, "you should have told them, they would have been so proud of you."

"Well...well..." stammered Joab.

"It was a last minute decision," said Dina.

"Now it's late to tell them, they are at work," said their Grandmother disappointed.

Joab winked at Dina who heaved a sigh of relief.

"I bet Bertha," Grandfather laughed, "that you are going to beat Grandmaster Shmilovich...ha-ha-ha..."

"You old horse...I invite you to a chess dual and we shall see!"

"When and where? Bobby Fischer!"

Suddenly the announcer's loud voice was clearly heard from the speakers: "All competitors are required to take their seats according to the numbers allocated at the reception, Please turn off your mobile phones. The exhibition is going to begin in ten minutes sharp. Success to all of you."

"Only God will help me, dear brother," said Dina and went to her place by the desk.

After a few moments, all fifty competitors took their places and Joab scanned them one by one. Auntie Bertha was very easy to locate because of her red hair and outfit, there was also Danny, two or three kids from his school, the mustached man with the big white cap that he remembered from the guided tour at Energy Castles the day before and a few others he knew were also present. He smiled at Dina that did not smile back. He located Nir in a corner looking with interest around and he was sure that he waited his mobile to vibrate the same as Joab himself, both of them expected Sniffy to come alive.

The Science Fair

Joab train of thought was cut suddenly when Mr. Levi, the CEO of Solar Deserts and the sponsor of this event, stood in the middle of the chess arena and delivered a small speech praising the game of chess as bearing very important educational values and of course his renewable energy company and then he invited GM Shmilovich to join him.

Grandmaster Shmilovich was a young man about thirty five and Joab was surprised that he did not wear glasses. Maybe he wears contact lenses or maybe he underwent a Laser Eye Surgery, impossible for a chess grandmaster to have perfect vision, Joab thought.

GM Shmilovich thanked for the opportunity to introduce chess to kids and adults alike and to spread the word of chess. The competition began.

Most of the audience stand behind the competitors and follow the moves on the chessboards. Joab, of course, was very much interested in what happens on Dina's board but he preferred not to stand behind her since he was sure his presence would only annoy her.

With the first move, the simul-giver and the competitors shook hands and GM Shmilovich moved quickly from board to board no more than a few seconds for making a move.

An hour after the contest began most of the competitors had already shaken hands again with GM Shmilovich and left their places disappointed. Surprisingly, auntie Bertha and Danny were still in business.

Dina lost heaving a sigh of relief.

"Never mind," said Joab disappointed.

"The Hippopotamus didn't work at all," said Dina laughing, "at last I'm free again."

"We are proud of you," said Grandmother and Grandfather kissing her again on her forehead.

Suddenly Sniffy was alive with a first-degree threat alert indicating an anonymous danger in the hall.

The Science Fair

They found a pretext to leave their grandmother and grandfather and moved to a corner. They overlooked the crowd carefully, but it was a mission impossible since there were many of them coming and going. Nir was also looking at his mobile, squinting suspiciously at their direction.

"Maybe the man with the big white cap," said Dina, "we meet him everywhere".

"He's here for a long time," whispered Joab, "It must be somebody that came a short time ago."

"Impossible to know," said Dina, "All the time people come and go, don't they?"

The match went on with the GM moving from board to board with agility and full of energies as at the beginning of the match, and after two hours more only seven competitors remained, and surprisingly, among them were still auntie Bertha and Danny.

After four hours, to their amazement, only Danny and aunt Bertha survived. After a few moves more, GM Shmilovich offered both courageous chess players a draw which was happily welcomed.

The big heroes were applauded by the cheering crowd and Danny's mother was the proudest mother in the world.

The announcer said that the prize ceremony would take place in ten minutes.

Auntie Bertha approached them smiling smugly at them, "you see kids, auntie Bertha is not so dumb after all. Where is your grandpa, I've one or two things to tell him."

"Bravo auntie!"

She took out her big red pipe from her shirt pocket, lit a match, held it up to the pipe and inhaled deeply nevertheless smoking was forbidden in public places.

"What are you going to do with the prize, Auntica Bertica?" said Joab.

"If you'll be good," promised Bertha, "I'll buy you a book about renewable energy, what do you say kids?"

"You are interested in solar energy, auntie?"

The Science Fair

"Who doesn't nowadays? Didn't you hear about ethanol fuel and solar power towers, for example. One can make a good honest buck by inventing something."

"Like what," asked Joab pricking his ears.

"Improving photosynthesis efficiency for example."

"What, you heard about switch..."

"Ouch!"

"Bravo Bertha," said Grandfather and Grandmother approaching them smiling.

"You see old horse...eh...," she said exhaling a large burst of smoke from her pipe forming a cloud around her face.

"Even old dogs bark sometimes," Laughed heartedly their Grandfather waving away the smoke.

First Week Observations

Joab and Dina planted, behind their shed, the three switchgrass plants they had removed from the soil, a few days ago, from the farm and the Energy Castles facility.

Dina warned Blacky not to dig the soil around the plants and not to play with them by any means.

The first plant, which was transferred from the farm, from the Solar Deserts' control group, was supposed to be an ordinary switchgrass plant.

The second plant was also from the farm but from the Solar Deserts' experimental group and was supposed to be a genetic engineered plant.

The third plant was removed from the Energy Castles facility and was of an unknown nature.

To their luck, they have removed the plants with enough roots and rhizomes and since switchgrass is a strong and adaptable plant and was irrigated lavishly by Dina they recovered almost immediately and went on growing undisturbed in their new home.

After the first adaptation period, which lasted for a week, Joab and Dina took observations in order to establish the baseline or the start point of their experiment, since the first adaptation period could not be regarded as an integral part of their experiment as Dina preferred to name it whereas Joab preferred "investigation" instead.

Joab photographed the three plants from different angles. They measured the height of the plants from soil to the top of the main stem and calculated the average stem diameter. Then they counted and recorded the number of leaves on each plant including the tips of new leaves just beginning to emerge and the number of the scarlet-orange flowers and buds.

But when trying to calculate the average leaf area and leaf color for each plant by using their cell phones' cameras and a botany image analysis application they met

The Science Fair

some difficulties not being able to overcome even by reading the manual a few times and joining professional forums on the web.

"We'll have to ask Hallelujah Bat Israel for help," said Joab SMSing her.

"But we'll have to pay her," said Dina.

"We did a good buck recently, didn't we?"

"Queer," said Dina, "I was sure that Mr. Levi is going to throw us all the way down his stairs and instead he was very satisfied and paid us according to our agreement."

"I think that maybe he believes in us."

"Strange."

"And besides," said Joab, "don't tell Mom or anybody else, she's going to ask us to give the money back."

"Hi guys," said Hallelujah without knocking the door.

Hallelujah was a Black Hebrew girl about fourteen. She was high and slim with short curly dreads. She always wanted to be a boy and preferred to be called Lulu. She played basketball and soccer like any other boy and never wore girl garments, and as a matter of fact she was a staunch feminist. She was agile like a monkey and could climb any tree or building. She was stubborn and defied her community's conventions and dropped out of school to her parent's disappointment. She had never asked her parents for money and was on her own. She made a living by hiring her computer and technical skills and as a matter of fact she was a hacker.

"What's up, how can I help you guys?"

"Well," Joab said, "We have some problems with a botany application that can calculate the average leaf area and leaf color of plants."

"Let me have a look." Said Lulu.

She played with the mobile's buttons and keys for a while.

"Look guys," she finally said, "the application calculates a leaf area in ordinary decimal numbers like cubic centimeters, millimeters, whatever. But for color it uses

The Science Fair

the hexadecimal or base 16 numbers. The hexadecimal or the hex numeral system uses sixteen distinct symbols, instead of ten, the familiar symbols 0–9 to represent values zero to nine, and six more - A, B, C, D, E, F."

"You mean like the HTML color code when a color could be something like 2B45ED."
Said Joab.

"Exactly guys. So in order to solve your problem, when you want to calculate the average leaf area use the ordinary decimal numeral system. Press on 'decimal' here whereas when you want to calculate the average leaf color press on 'hex', got it."

They tried it on a potted plant that was placed in a corner of their shed and it worked perfectly to their satisfaction.

"You are some expert Lulu, why not joining our detective agency?"

"Thanks guys," said Lulu, "But I prefer to remain a freelancer and to manage my own business, thanks for your kindness, anyway."

"Then how much we owe you?"

"Well, for now nothing, is a petty job, but be sure that the next time I'm going to cut your throat," Lulu smiled, moving her palm across her throat.

"Then we owe you a favor."

She left the shed without saying goodbye.

"Good for her," said Dina admiringly.

"What a shame she declined our kind offer." Said Joab, disappointed.

They hurried to the switchies and this time the botany application did a great job. It calculated the average leaf area and leaf color for each plant without any delay and even translated the hex values into decimal ones.

After they had all the readings at their disposal they used an excel spreadsheet to calculate the Plant Development Index (PDI) – meaning, averaging all their readings, regarding each plant, into one number that will help them find out clearly which plant thrived better over time. For convenience, they set the three initial PDIs at 100, but

The Science Fair

they could also have set them at any other convenient number of their choice, as well.

To begin from PDI=100 was very logical to do even though at the beginning the switchgrass plants were different in size but they did not have any idea when exactly the plants had been planted or seeded. So from then on, their observations were meant to reflect not the plants' absolute development stage but rather the extra development or growth rate gained relative to the baseline of 100 in percents.

At the end, Joab and Dina tabulated and graphed their findings and summed up their ideas in the following table.

Switchgrass	Origins	Baseline (PDI)
ordinary	Solar Deserts	100
engineered	Solar Deserts	100
unknown	Energy Castles	100

During the coming weeks, after the experiment baseline had been established, they planned to irrigate the plants, only twice a week, two liters per plant to see to what degree they were adapted to thrive on little water and compare between them.

Dina wanted to remark something but Joab's cell phone ringtone cut her train of thought.

"It Sniffy again," said Joab startled.

"I hope we don't have something ominous in our garden."

"This time it's not a threat," said Joab relieved, "it's only a piece of information."

They pored over Joab's cellular and Dina read aloud.

"Shhh...somebody can hear you."

"Who, the switchies?"

"Even walls have ears."

They read in silence for a while.

=====

The Science Fair

(Translated from Chinese)

From China Business:

A big sensation at the chess simultaneous exhibition that took place on Tuesday in Dimona, Israel when GM David Shmilovich, rating 2785 and ranked 7th in the world drew with a twelve years kid and a woman about sixty, both are not ranked.

The contest was sponsored by Solar Deserts, Inc., a leading renewable energy start-up located in Dimona, Israel.

Last reports insinuate that the company is on the verge of a major breakthrough concerning a substantial improvement of photosynthesis efficiency of some grasses that will revolutionize ethanol fuel production from plant cellulose for traffic use and direct combustion for fueling power plants for electricity generation in the form of energy pellets.

No wonder that the Solar Deserts stocks are on the rise on Wall Street.

=====

"Good for them," said Dina envious. "They can get very rich."

"Then next time learn the Hippopotamus Defence by heart," laughed Joab.

"Next time you are going to sweat with the hippopotamuses and the giraffes in the jungle," smiled Dina back.

"What do you think about this article?" changed Joab the subject.

"It looks like that for some reason Sniffy is in love with China. He also emphasized the word 'China' in the article he sent us about switchgrass."

"The Chinese syndrome."

"What lucky we are to have dear Sniffy, otherwise how on earth could we obtain such information from a Chinese paper and also so nicely translated to Hebrew."

"But this article suits more a chess magazine than a business one, doesn't it?"

The Science Fair

"You are right," Dina agreed, "this article looks more like as an advertising commercial for Solar Deserts rather than anything else. And it's not for the first time. Who in China cares for a chess competition in Dimona unless you want to use it for public relations."

"But maybe one billion Chinese people can't be wrong and we should follow the Chinese path."

"But what's more strange," said Dina, "that the article is not a negative one at all, as we requested, but rather very positive indeed. They sponsor a chess event, have scientific achievements and thrive on Wall Street. This is more positive than positive could be, isn't it?"

"Maybe that's the reason," said Joab thoughtfully, "that Sniffy sent us this article and no other."

"I don't understand."

"Because," said Joab, "maybe it looks positive to us but as a matter of fact it is negative."

"Because Sniffy has a human brain," said Dina thoughtfully, "and sometimes "good" means "bad", remember?"

The Treasure Hunt

It was a nice summer evening. Joab and Dina were discussing the latest events behind a closed door in their shed. Blacky was gnawing on some bones in the garden not before Dina ensured that he is not interested in the three switchgrass plants. In the background, they heard the animated voices of their Mom and Dad discussing with some friends, on their terrace, about everyday life issues.

Dina was sitting relaxed by the table since she at last got rid of this annoying chess business while Joab was wandering restlessly around the shed when suddenly Sniffy blipped.

"Oh my!"

=====

From the internet edition of the Dimona Gazette

You are invited to join the Treasure Hunt Game sponsored by Solar Deserts - a leading renewable energy start-up located in Dimona, Israel.

In order to win, you have to solve seven riddles. The game begins when the first riddle is sent to your email inbox. If you answer back correctly, you will be sent the second riddle, and so on until the seventh riddle. Only three wrong answers are allowed for each riddle. A riddle must be solved in two days time - after that, the solutions will be published and not accepted anymore.

The one that first solves the seventh riddle will be awarded 10,000 shekels.

Register now and get your first riddle right away.

Success!

Register

=====

"Wow, ten thousand shekels, Din!"

The Science Fair

"Then let's register, Jobby." said Dina hitting excited the "Register" button.

After they calmed down a little bit Joab said, "The same story again."

"What story?"

"Well, we look for negative articles about Solar Deserts and dear Sniffy sends the opposite."

"Hopefully Sniffy is clever enough," said Dina.

"It looks like public relations promotion again."

"What's wrong about public relations, Jobby? All of them are doing the same...helping children and the elderly..."

"All of them are caring only about profits and not people," said Joab disappointed.

"Look who is speaking..."

"In any case 10,000 shekels more won't hurt." Said Joab.

After a few minutes, the email arrived and they learnt it excited for a while. It read:

=====

To: Science Gumshoes Detective Agency

Welcome to the Treasure Hunt Game sponsored by Solar Deserts - a leading renewable energy start-up located in Dimona, Israel.

Your first riddle:

Decipher the following code:

A A B C E H M U H C K N

Reply your solution to us and if correct, you will be sent the second riddle. Remember, only three attempts and two days are allowed for each riddle.

Do not forget: The one that first solves the seventh riddle will be awarded 10,000 shekels.

The Science Fair

Success,

The Treasure Hunt Game Team

=====

"Wow, ten thousand shekels, we can open a real detective agency with a secretary and nice offices," said Joab joyfully.

"Aren't you putting the cart before the horse?" Dina spoiled his enthusiasm smiling, "before we spend the money we have to earn it, don't we?"

"Then let's go, Din!"

Dina uncluttered their big homework table and wrote down, on a big white sheet of paper, twelve big letters, and placed it in the middle of the table.

"Let's have some tea and biscuits before we begin," suggested Joab and hurried to their small makeshift kitchen.

"Good idea," agreed Dina, "A long white night is waiting for us."

They pored over the letters for a while.

"It looks like a word game," suggested Dina, "when you are required to rearrange the letters into words."

"So, we have to reshuffle the letters and see what meaningful words we can create."

"Exactly," said Dina satisfied, "reason says that words should relate to renewable energy like 'solar energy', 'photosynthesis', 'ethanol fuel', 'switchgrass' and other similar terms should come up but I don't see any, do you?"

Joab scanned the twelve letters for a while but was not able to see any useful letter combinations.

"I have an idea," said Dina, "there are a few websites that are looking for anagrams and making the combinations for you, they are useful for cryptic crossword puzzles, let's try them."

"Anagram, what's this?"

The Science Fair

"An anagram," said Dina, "is the rearrangement of the letters of a word or phrase to produce a new word or phrase by using all the original letters. For example, "tea" and "eat" which are different words composed from the same three letters."

"Auntie Bertha likes this kind of crossword puzzles," said Joab concerned, "I hope she is not after the treasure hunt."

"But before that," suggested Dina, "let's try Google, it has its own suggestions."

"Okay..."

They googled the twelve letters in different combinations, but to no avail. Then they tried letter combination and anagram dedicated sites, as Dina has suggested, but no meaningful results.

"Why not ask Mom and Dad for help." Suggested Dina hopefully.

"In another situation it could have been a good idea," said Joab, "but since this treasure hunt was suggested by Sniffy, maybe it has something to do with our job, and the best is to leave it in the shadows."

"Okay,"

"Dinner's ready!" their mother called suddenly from the kitchen.

"Darn! Darn! Darn!" Joab stamped his foot, "not now!"

"Maybe it's a good idea to take a break," said Dina, "sometimes a refreshed mind has new insights."

"Dinner's ready!" she repeated, allowing for no argument, and Joab and Dina trooped unwillingly into the kitchen.

After half of an hour, they were back staring at the letters again.

"Maybe," suggested Joab, "the letters are shifted one place, like is the case with many ciphers. A=B and B=C and M=N and X=A and so on."

"Let's try this option," said Dina.

The Science Fair

By shifting all the letters one place according to ABC order they got a new set of twelve letters and began the procedure again - googling and trying anagram sites but again to no avail.

"But maybe," said Joab, "the letters are not shifted one place, maybe two places.

"Why not three Jobby? And why not ten places. We have to check twenty five options, it'll take us all the night."

"If we are unlucky," smiled Joab despondently, "there could be also worse possibilities."

"Like what," said Dina tortured by the thought.

"What if one letter is shifted two places and the other ten places and so on."

"Then we'll never open a real detective agency," said Dina smiling.

"I think," said Joab, "that we are on the wrong path."

"What do you mean by that?"

"Look, it's the first riddle Din, right? It must be very easy in order to encourage the hunters, let's try the simplest option."

"Like what Jobby?"

"Maybe the letters represent numbers: A=1 and B=2 and C=3 and so on."

"Good idea."

They converted the letters into numbers and instead of twelve letters, they had in front of them twelve big numbers, written on a new sheet of white paper.

1 1 2 3 5 8 13 21 8 3 11 14

After a while Joab said, "the first eight numbers are something familiar, they are constantly growing and they look like some kind of a progression but they are not an arithmetic or geometric progression that we learnt about at school."

"Then," Dina said, "Let's, first of all google all twelve numbers together."

"Nothing."

"Now let's google the first eight numbers alone," suggested Joab.

"Bingo, Fibonacci Numbers," said Joab elated, "Ten thousand shekels, hurray."

"Wait a minute, Jobby, what are those Fibonacci Numbers at all?"

"Let's see what Wikipedia has to say about them."

=====

The Fibonacci numbers are the numbers in the following integer sequence:

1 1 2 3 5 8 13 21 34 55 89 144...

By definition, the first two numbers in the Fibonacci sequence are 1 and 1, and each subsequent number is the sum of the previous two.

For example, the third number $2=1+1$ and the fourth number $3=1+2$, etc.

Leonardo Fibonacci was an Italian mathematician, one of the most talented western mathematicians of the Middle Ages.

Fibonacci is best known to the modern world for the spreading (though, not inventing) of the Arabic numerals (the number system we use today) and the decimal number system in Europe, primarily through his *Book of Calculation* from 1202.

He is also renowned for a number sequence named after him, the Fibonacci numbers, which he did not discover himself but used as an example in his mentioned above book. The sequence had been described earlier in Indian mathematics.

=====

Dina copied the first twelve Fibonacci numbers from the screen.

1 1 2 3 5 8 13 21 34 55 89 144

"Now I understand what are the Fibo... Fibo...never mind...numbers," said Dina satisfied, "It all begins from the third number. For example, the third number 2 equals to the sum of the two previous numbers $1+1$, and the ninth number 34, for example, equals to the sum of the two previous numbers $13+21$."

The Science Fair

"Then your private math tutoring was not a complete waste." smiled Joab.

"Oh my!"

Now Dina wrote their converted numbers under the Fibonacci.

Fibonacci - 1 1 2 3 5 8 13 21 34 55 89 144

Converted - 1 1 2 3 5 8 13 21 8 3 11 14

"The first eight numbers including 21 are the same as Fibo... Fibo... Fibonacci," said Dina, "but what about the rest four, they don't fit in since the ninth Fibonacci number is 34 whereas our ninth converted number is 8 and the same is for the rest three. Maybe the last four are something else, let's google them."

"What a shame Google, nothing" said Dina disappointed.

"There must be a simple solution," Joab was thinking aloud, "there must..."

"Eureka!"

"Oh...what?" blurted Joab startled.

"Easy as ABC, Jobby."

"Then tell us, clever Einstein," said Joab hopefully.

"The ABC has 26 letters," said Dina, "A=1 and the letter Z= 26 of course, but what if we need a letter for the number 27, for example, than it's A again and if we need a letter for 28 then its B and so on. So A=1 and A=27 and also A=53; B=2 and B=28 and B=54 and C=..."

"Exactly," said Joab satisfied, "The meaning is that in our case the ABC is not written straight on a line but on a circle and A comes again after Z and so on. And if we go around the ABC circle enough times then we can convert any number to a letter."

"The ninth Fibonacci number is 34 and the respective letter must be the eighth letter in our alphabet since $34=26+8$. Let's see, the eighth letter in ABC is...is...H of course, and that's exactly the ninth letter in our riddle."

The Science Fair

"And the tenth letter C equals to 55 if we circle the ABC twice since $55=26+26+3$ and so on with the rest of the letters."

"Biggie! Biggie! Biggie!"

Joab replied with two words: "Fibonacci numbers" and they stretched their backs and ate biscuits and drank tea satisfied for a while when their second riddle arrived.

They were eager to see the riddle but when they realized that it was almost 4 o'clock in the morning they left the intriguing job for the next day.

The Second Riddle

The next day Joab woke up at late afternoon. Before brushing his teeth and washing his face, he checked that the three switchgrass plants were still in place and rushed inside to check for incoming mail.

He pored over some mysterious words for a while and started the impossible chore to wake up Dina. After shaking her for a while, she could manage to open a half eye.

"What on earth, Jobby?"

"The second riddle, remember?"

"What riddle, thickhead?" said Dina stretching out her muscles during a long yawn.

"O!...M!...G!... Din, ten thousand shekels at stake, remember?"

At this, Dina jumped from her bed and in a few minutes both of them pored enthusiastically over their computer screen sipping tea and munching cookies.

=====

To: Science Gumshoes Detective Agency.

Congrats. You have solved successfully the first riddle about the Fibonacci numbers. Your rank is now 74.

Your second riddle:

What is the meaning of the following:

Renewable energy in the old book; bush; desert; departure; 1879.

Reply your solution and if correct, you will be sent the third riddle. Remember, only three attempts and two days are allowed for each riddle.

Do not forget: The one that first solves the seventh riddle will be awarded 10,000 shekels.

The Science Fair

The Treasure Hunt Game is sponsored by Solar Deserts - a leading renewable energy start-up located in Dimona, Israel.

Success,

The Treasure Hunt Game Team

=====

"What a shame," said Joab despondently, "We are ranked only 74."

"Never mind."

"For God's sake Din," said Joab, "At this moment 74 hunters are in front of us and if you are going to sleep and yawn your life away we would never win the pot."

"Then let's go!"

They read the clues for a while.

"I don't have any idea," said Dina shrugging her shoulders, "and you?"

"The same."

They googled all the words together and alone and in any other possible word combination, but to their disappointment nothing worthy came up.

"Why not asking Sniffy," suggested Dina.

"A good idea," agreed Joab typing on the smartphone touchscreen.

But to their disappointment, Sniffy said that the mission is in progress, and no more.

"The riddle begins with 'renewable energy in the old book'," said Dina looking at her laptop, "maybe there are in existence some old renowned books about renewable energy at the public library."

"Good idea Din, let's go."

Before they left for the library, they checked again the switchgrass plants and locked the sad Blacky in the shed.

The Science Fair

"We are really sorry Blacky," said Dina gently caressing his nose, "regretfully dogs are not allowed in the library and to leave you alone in our garden it's a little too risky for the switchies, isn't it?"

The public library in Dimona has been always an important cultural center especially before the Internet and TV eras when most of the population visited the library from time to time to borrow a book or to join a readers club activity. However, even now, despite the dwindling number of book fans, many still regard the library as their second home.

After half an hour, Joab and Dina arrived to the almost empty library. It was a spacious hall crowded with endless bookshelves uploaded with thousands of books of all size, color and topic.

The librarian greeted them smiling, "I haven't seen you for ages."

"Well, it's time to read a good book," said Joab.

"Like what," she asked with interest.

"Well...well, we would like to read some old science books about renewable energy."

"Very interesting," she said, "you are not the only ones to ask for such a bizarre advice recently. One is supposed to be interested in updated science books, unless he is doing some research in history of science or something. Well..."

"It's for our science fair project," offered Dina.

"Good luck to you kids."

"And did they find something," asked Joab concerned.

"Who do you mean, Jobby?"

"All those that asked you, like us, about old renewable energy books."

"Ah...yes...as far as my impression goes," said the librarian, "all of them left the library disappointed."

Joab winked relieved at Dina and the librarian directed them to a corner where some obsolete scientific books were located on a shelf.

The Science Fair

"Hi guys," smiled suddenly the squat Nir out of the blue.

"Hi,"

"Old books, ah..."

"What's wrong with old books, thickhead?"

"And also about renewable energy, ah..."

"There are some more interesting topics in the world than renewable energy." Said Joab.

"Really, stop fooling around with me," said Nir, "you are not the only ones after the treasure, guys."

"If you mean the treasure hunt game," said Joab, "then we are not after it because it is a total waste of time. The chances for kids to win are very slim since some big boys are in the game."

"But not if we put our heads together."

"I don't understand what you are talking about," said Joab indifferently.

"I am talking about that I'm now ranked 29 in the hunt, and you?"

"Well...we are ranked...ranked..." stammered Dina.

"Ow!"

"And don't think for a moment that I don't know about your Science Gumshoes Detective Agency, guys."

"Wow, how do you know, I didn't tell anybody, I swear Jobby."

"But your clever brother did."

"Well..."

"And I bet," Nir said, "that if we open a detective agency together, we could set the world on fire. What do you say guys?"

The Science Fair

"A very kind offer, indeed," Joab said politely, glancing at his watch. "We will let you know, okay?"

"And how is your Sniffy doing this days?" said Nir with a self-satisfied smirk on his face.

"Totally useless," admitted Joab since he knew it was pointless to deny since all the guys at the club used it. "And yours?"

"Mine went totally out of his mind," smiled Nir, "all this stupid Chinese articles, but I know what's wrong with him."

"Then tell us Perry Mason," said Dina.

"That's my little secret," said Nir winking and he vanished in thin air.

Only now, after Nir has left they noticed an old man with a scolding look on his face browsing a book not far from them. Maybe the animated discussion with Nir disturbed his peace of mind.

Satisfied to get rid of Nir they studied in silence the old books for a while but naturally, the old science books had almost nothing about renewable energy.

"I think that we are on the wrong path," said Dina, "maybe 'old book' doesn't necessarily mean a scientific book because of the renewable energy connection, but maybe old books in general."

"Good idea!"

They went to the reception desk again and the librarian directed them to the history and religion section.

Auntie Bertha's red haired head popped up from behind some huge ragged tomes.

"My rank is 9, and yours?" she smiled at them smugly.

"Please auntie, give us a hint, please." said Joab.

"Why should I kids?"

"You can join our detective agency." Said Joab.

The Science Fair

"A very kind offer, indeed, I'm a little too old for this, but nevertheless my brain is still strong enough to solve riddles."

"Auntie, please."

"Well, because you are good kids I'll give you a hint."

Joab and Dina pricked their ears, "please, auntica Berthica - the smartest aunt in the world."

"You must learn, kids," she said smiling, "that flattery won't help you with me, but because I love you so much, I can say that you are now at the right place and that I left a clue for you. Bye kids."

"Wow, let's look around," uttered Dina excited after she left.

They scanned the old religion books for a while, and there were many of them, when suddenly Dina noticed a red bookmark stuck into the pages of a big heavy black book.

"Red is Auntie," said Joab excited, snatching the book from the shelf.

"It's the Bible, It's the Bible, I knew it." Said Dina excited.

"Then why did you hide your wisdom for so long?"

They checked out eagerly the two bookmarked pages of the Bible but nothing relevant popped up. They wrote down the name of the biblical book, chapter and verses, just in case, and returned the Bible to its place on the shelf.

"Let's go home," said Joab, "A public place is not ideal for discrete discussions, is it?"

In a few minutes, they arrived panting home, let the happy Blacky out, and immediately studied the riddle again.

=====

Renewable energy in the old book; bush; desert; departure; 1879.

=====

The Science Fair

"If the Bible is the old book," said Dina "then it's clear that 'renewable energy' is not renewable energy in the modern sense of the word but something similar that we are looking for. So let's replace 'old book' with 'bible' and omit 'renewable energy' at all."

"Then our new riddle looks like this," said Dina scribbling quickly on a new white sheet of paper:

Bible; bush; desert; departure; 1879.

"As far as I know there are Bible portals with search capabilities," suggested Joab, "let's try one of them."

"Good idea, indeed."

One big Bible portal offered different versions of the Bible to choose from and they decided to try the King James Version because they heard something about it at school.

Now they typed the first term 'bush' in the search box.

The first entry read:

=====

Exodus 3:2

And the angel of the Lord appeared unto him in a flame of fire out of the midst of a bush: and he looked, and, behold, the bush burned with fire, and the bush was not consumed.

=====

"Wow, it's about Moses and the burning bush," said Dina excited, "When Moses was appointed, in the middle of the desert, by God to lead the children of Israel out of Egypt."

"The key to this," said Joab, "is 'and the bush was not consumed' the same as renewable energy which is inexhaustible."

"And this also happened in the desert, as we have learnt at school - another word of the riddle" added Dina eagerly.

The Science Fair

"And what a queer word is Exodus," Said Joab googling it.

=====

Exodus (from Greek "departure"), is the second book of the Hebrew Bible.

=====

"So "departure" also fits in," said Dina, "but what about '1879' the last one?"

They googled '1879' together with the other words of the riddle and when they did it with 'exodus' no more than a few seconds passed to find out the connection in Wikipedia.

=====

Exodus of 1879

It was the first general migration of African Americans following the Civil War.

Exodusters was a name given to African Americans who migrated from states along the Mississippi River to Kansas, where a homestead act offered free land to settlers, in the late nineteenth century, as part of the Exoduster Movement or Exodus of 1879.

=====

"Also '1879' fits in," said Dina satisfied.

"Then we solved the second riddle as well," said Joab exhilarated by success.

Joab replied immediately their solution: 'the burning bush' and after a few minutes, they found the third riddle in their inbox.

Second Week Observations

The three switchgrass plants were moving gently in the wind while Blacky was eyeing suspiciously this new strangers that unauthorized invaded his garden.

The three switchgrass plants survived the transfer from their former locations because switchgrass is a tough adaptable plant and the three of them were irrigated lavishly everyday during their first week in Joab's and Dina's garden. At the end of this period, they established the baseline (PDI=100) of the experiment as Dina called it or investigation as Joab preferred.

During the second week, they watered the plants only twice, two liters per plant, to see to what degree they were adapted to thrive on little water and desert life.

At the end of the second week, Joab and Dina repeated the same observations, for each plant, as after the first week - took photos, measured the height and stem diameter, counted the leaves and flowers and calculated the average leaf area and leaf color for each plant by using the botany image analysis application - but this time without any difficulties thanks to Lulu.

They used the readings to calculate for each plant its Plant Development Index (PDI) - that is, the averaging of all the plant observation readings into one number that is instrumental in demonstrating clearly the development rate of a plant over time.

A week ago, after the first observations, out of convenience, they set the initial experiment baselines, or PDIs, of the three switchgrass plants at 100.

Now, a week later, Joab and Dina calculated again, using an excel spreadsheet, the PDIs of the three plants relatively to the last week readings and tabulated the results.

The Science Fair

Second Week Observations

PDI = Plant Development Index

Switchgrass	Origins	Baseline (PDI)	Second Week (PDI)
ordinary	Solar Deserts	100	103
engineered	Solar Deserts	100	102
unknown	Energy Castles	100	123

Irrigation: twice a week, 2 L per plant

They compared the data recorded now to the data recorded a week ago.

They were surprised to find out that the PDI of the supposed ordinary plant was a little bit higher than that of the supposed engineered plant - 103 vs. 102.

The meaning was that, as it looked like for now, the engineered plant did not have any advantage on the ordinary - contradicted to what they have expected and hypothesized.

But most surprisingly was the fact that the unknown switchgrass plant from the Energy Castles facility thrived the best and by far.

"Maybe," Dina said, "the results are like this because of the transfer that disturbed their normal course of growth."

"This makes sense," agreed Joab, "after the next week observations we are going to be smarter."

"Or fooled again."

Suddenly Sniffy went alive.

=====

(Translated from Chinese)

From China Business:

The hunt for the Biblical renewable energy.

On a treasure hunt game composed of a few riddles, the second riddle solution was about the Biblical burning bush when the angel of the Lord appeared unto Moses in

The Science Fair

a flame of fire out of the midst of a bush and the bush was not consumed (Exodus 3:2).

Today, many Bible enthusiasts hunt for Noah's Ark or the Ark of the Covenant but we suggest all hunters try to find the burning bush instead since as it looks like a few burning bushes can solve the world energy crisis.

The treasure hunt game is sponsored by Solar Deserts, Inc., a leading renewable energy start-up located in Dimona, Israel.

There are hints that the company is on the verge of a major breakthrough concerning a substantial increase of photosynthesis efficiency of some grasses that will revolutionize ethanol fuel production for traffic propulsion and energy needed for power station operation in the form of high-energy biomass pellets.

The Solar Deserts shares continue their way up on Wall Street.

=====

"Again this Chinese paper," said Dina.

"And again it looks more like a commercial for Solar Desert than anything else." Said Joab.

"And it has the same format," said Dina, "short header, the body and the same footer which glorifies Solar Deserts of course."

"But why this Chinese business again and again, Din?"

"Maybe it's Sniffy to blame for and nothing really important, Jobby."

"But let us assume, for the moment, that Sniffy is okay, then what?"

"Then we can't explain the Chinese business, at least not for now."

Suddenly the awaited email arrived:

=====

To: Science Gumshoes Detective Agency.

The Science Fair

Congrats. You have solved successfully the second riddle about the Biblical burning bush. Your rank is now 46 better than your last 74.

Your third riddle:

Three religions and one clue at the Luna Park.

Explain your solution.

Reply your solution and if correct, you will be sent the fourth riddle. Remember, only three attempts and two days are allowed for each riddle.

Do not forget: The one that solves first the seventh riddle will be awarded 10,000 shekels.

Success,

The Treasure Hunt Game is sponsored by Solar Deserts - a leading renewable energy start-up located in Dimona, Israel.

The Treasure Hunt Game Team

=====

"We are ranked now 46," said Joab cheerfully, "It will be very interesting to know Auntie Bertha's and Nir's rank now."

"I bet that better than ours, at least Auntie's since she left us the Bible clue."

"Time is short and we've got a lot to do," said Joab, "Let's solve the third riddle".

Dina read the riddle aloud, "Three religions and one clue at the Luna Park."

"We don't know what three religions and one clue mean, but we certainly know what is a Luna Park, don't we?"

"Then let's have some fun at the Luna Park," said Joab joyfully.

Joab and Dina Have Fun at the Luna Park

The Luna Park comes to Dimona every summer vacation for two weeks and is not even necessary to mention that it is impatiently awaited by children and adults alike.

For small kids there is always welcomed a carousel with prancing model horses, carriages and swans to ride and also slow trains and cars do the trick.

For big kids and grownups there is the octopus ride when eight arms attached to a central axis spin and move up and down in random, while cars at the end of the arms spin on rotary bolts.

There is also a roller coaster that consists of a track that goes up and down in different patterns sometimes with one or more loops that turn the screaming rider briefly upside down.

One of the main attractions in any Luna Park is the Ferris wheel consisting of a rotating upright wheel with passenger cars attached to the rim of the wheel in such a way that as the wheel turns, the cars are always kept upright by gravity. In some cases, a Ferris wheel can be even 165 meters tall and you can sit back and enjoy the best view of Dimona from above.

Stands of ice cream, food, snacks and candy are always of great demand.

It was seven o'clock in the evening when Joab and Dina arrived to the crowded Luna Park, but this time they were not on their own since their mother requested they take with them their little brother and sister the twins Ami and Tammy, which were waiting a long time forward for the Luna Park.

To Dina's disappointment, Blacky was not present since dogs were not allowed inside the Luna Park.

Dina had her camera hanged on her neck and Joab had besides his camera his binoculars what usually is not convenient at all if you intend to enjoy the rides, but they came here on a mission and a camera and a pair of binoculars could prove essential.

The Science Fair

The park was humming, buzzing and flashing with lights of different size and color. The park was crowded to the brim with children and adults enjoying themselves alike.

Sniffy went alive telling about imminent threats and when Joab and Dina looked around, they recognized many people from their school and neighborhood but no somebody really suspicious. It was like to look for a needle in a haystack. However, it was not something to worry about since they were in a crowded place.

They mounted Ami and Tammy on the carousel horses and hoped for some time free to enjoy themselves.

Their dad was also around with Hagar, their little sister, sat in her buzzing electric wheelchair with Ruthy the doll on her lap, as always.

"Hi kids," their dad smiled at them, "I see that you know how to enjoy yourselves."

"You can bet, Daddy," said Dina caressing Hagar's head.

"Hi Hagary," said Joab helping their Dad to mount her on a nearby horse.

The carousel began to turn slowly around before gaining some extra speed.

All three of them waved to the little ones and they waved back enthusiastically.

A white-faced clown with a black big nose, who was also riding a horse waved at them smiling from ear to ear through his enormous red lips and Dina waved him joyfully back.

"Do you know this guy, Din?" Said Joab with interest.

"No, why should I?"

"Then why do you wave to him, for God's sake?"

"Why not, meathead?"

"Don't forget that Sniffy warned us and we should beware. Better to stay in the shadows."

"Yes, Sherlock Holmes."

The Science Fair

"Before we take a ride let's move a little bit around," suggested Joab.

"Okay, boss."

"I hope you didn't forget our riddle," said Joab pointing sternly at his cell phone.

"Three religions and one clue at the Luna Park." Dina read it aloud.

"Shhhh..."

They bought the little ones a few snacks and since Hagary was with their dad, they were free for a while.

They walked through the crowded attractions and looked with interest around but they did not find any clue to help them to solve the riddle. Then they went to buy some ice cream and they saw Nir at the top of the long line but they ignored him.

They went on looking around passionately licking their ice cream for a while realizing that they came up with nothing and they decided, at least, to take an enjoyable ride.

The line to the octopus ride was smaller than to other attractions so they decided to begin there.

After almost half an hour they mounted a carriage, belted themselves and they were in the air. At the beginning the machine spun slowly and the ups and downs were tolerable. But suddenly the octopus arms began to move madly to the shouts and laughs of the passengers.

"This clown again," whispered Dina holding strongly to the safety handles.

"Where...what..."

"Two cars behind us," nodded Dina with her head in that direction.

The clown was waving at them enthusiastically.

Joab ignored his waving and took a stealth photo of him.

"This sinister clown frightens me," said Dina, "he looks like a smiling devil with this white face of his."

The Science Fair

"You don't have to worry about, I'm sure he is somebody we know and he's playing tricks on us."

"Oh my God, this shaking octopus and this clown...oh my..."

To Dina's relief, the ride came to rest, they went down, stretched their backs and Dina heaved a sigh of relief.

"What about more ice cream, Din."

"We are in charge of Ami and Tammy, remember?"

"This enjoyable fact, slipped my mind," said Joab smiling, "let's find them."

They toured the rides, children games, and the food stands for a while and on their way, they met unwillingly a few kids and neighbors that forced them to exchange some small talk. To their relief they located the twins with their Dad and Hagar. They were again free on their own.

"Let's try the roller coaster," suggested Joab.

"For me the octopus was enough," smiled Dina.

"Then the Ferris wheel, Din."

"Too high."

"But it moves so slowly."

"Okay, little brother."

The line to the Ferris wheel was very long and they waited impatiently to take the ride. And since a lot of time was in front of them they carefully looked around and took some pictures. They had even seen Nir in the distance dealing with his smartphone and this reminded Joab to look at his - Sniffy was like mad this evening emitting a few danger alerts.

"Dear Blacky, how much we miss you," said the sad Dina.

"I hope," said Joab concerned, "that he won't destroy the switchies, our sole findings. We have forgotten to lock him in the shed."

The Science Fair

"Don't worry," said Dina, "Blacky is very obedient and he's not going to destroy anything, I'm more concerned about the little ones in this regard."

At last, their turn arrived and they mounted their car, locked their seat belts under the inspection of a steward and after all the cars were full with passengers the giant wheel began to turn slowly around. Sometimes they were up and sometimes they were down. When they were up they were able to see the Dimona lights from above but nevertheless Dina preferred the down position.

The big wheel kept turning round after round and Joab and Dina took a few pictures more when suddenly, when they reached the highest point on the wheel, it stopped moving.

"What's this?" Said Dina concerned.

"Nothing serious at all," assured Joab, "they are going to fix it in a few moments, you'll see."

"At least," said Dina, "if we are stuck at the bottom we can escape, but now..."

The moments went on and they still remained hanging between heaven and earth.

"At least," said Joab, "if to be stuck then at the highest. Let's enjoy the view and take a few shots of Dimona. Maybe we are going to win a photography contest."

Run out of any other viable option, Dina agreed, and they took some shots of the Luna Park and Dimona from above and photographed other concerned wheel passengers as well.

"The clown again," pointed Dina worried.

The clown was sitting alone in a car, not far from them, and was waving at them joyfully.

Joab took a few shots of him and the clown photographed them back with his camera.

"I'm really afraid of him, Jobby," said Dina concerned, "maybe he's the danger alert Sniffy is talking about."

The Science Fair

"Come on, don't be so blue. We are in the crowd and besides Dad is also here."

At last, to Dina's relief, the wheel moved again and after a few minutes that looked like eternity, they were on safe ground again.

Dina looked carefully around but the clown vanished in thin air.

"It's enough for today," said Joab despondently since they had fun but nothing helpful about the third riddle.

Suddenly Dina's mobile rang, it was their mother.

"Where on earth have you two been?"

"At the Luna Park of course, Mom."

"And you are okay kids?"

"Of course we are okay, what kind of a question is this?"

"All the news are buzzing around with this stuck wheel and the cellular networks collapsed altogether because everybody is calling...but if you are okay... "

"As a matter of fact we were stuck on the very top of the wheel."

"Oh my God! And now you are safe, right?"

"Of course, Mom."

"Then I understand that it's moving again."

"Yes, it's moving."

"Thanks God."

"Ami and Tammy are at home?" said Dina concerned.

"Of course they are, but you were supposed to bring them back and not your dad, weren't you?"

"We are sorry Mom."

"You are irresponsible kids."

The Science Fair

"But we were stuck on the wheel, you know..."

"You shouldn't have left them alone in the first place."

"Sorry for that, Mom."

"So, when are you coming home?"

"We are under way, bye Mom."

Three Religions

The first thing Joab and Dina did after returning home, from the Luna Park, was to check if the three switchgrass plants were still in place and in the same time they also noticed that Blacky was toying with a tennis ball in a corner.

They were relieved to find out that their mother was occupied and dinner was not expected this evening since all of them had earlier a snack or two at the Luna Park. The good news about this was that that they would not need to report about the incident with the twins and avoid further scolding and as a matter of fact they could retire undisturbed to the shed.

"This riddle is a tough one," said Joab despondently.

"We don't know even where to begin," added Dina.

"The only constructive thing we can do for now is to read the riddle carefully again."

"Let's do it."

Three religions and one clue at the Luna Park

After reading it aloud a few times more Dina said, "Everybody knows that that are three monotheistic religions – Judaism, Christianity and Islam but were on earth at the Luna Park? Maybe better to begin with the 'one clue'."

"You are right," agreed Joab, "a clue is something that is meant to help us to discover the solution of the riddle, but we don't have any idea where to find one especially if we take in account that so many things and events could happen at a Luna Park."

"But the riddle says 'one clue' and I think that the 'one' implies to something unique, doesn't it?"

"Something unique...unique..." muttered Joab to himself.

"The only unique event that crosses my mind is that we were stuck on the wheel," said Dina.

The Science Fair

"Good idea, indeed."

"Well..."

"It's clear that a good clue must be something really outstanding to attract attention but in the same time must look as something normal, not too easy."

"What about the clown, Jobby?"

"What about him?"

"As you put it, something unique that can attract attention and still looks normal..."

"Come on, Din," said Joab, "I don't understand what's so outstanding about a clown?"

"A simple clown maybe not, but a sinister one that all the time is waving at us on the stuck wheel, maybe yes."

"Bingo, Din."

"I don't understand a word."

"Both of them, the stuck wheel and the clown together are the clue we are looking for." Said Joab excited.

"Wait a minute," doubted Dina, "say you are right and the wheel and the clown are the clue to the riddle, how on earth this leads us to "three religions"."

"How...how..."

"Wait Jobby, the stuck wheel was seen by all the people in the Luna Park and even was on the news, but the clown waved only to us..."

"Who told you that the clown waved only to us, thickhead? He probably waved to many people all the evening as well. You think that the riddle is only for us?"

"But he waved only to us on the wheel, I'm sure."

"So, you want to tell that somebody wants to help us to solve the riddle?"

"It looks like."

The Science Fair

"Come on, clever Albert."

"But he even photographed us, Jobby, and many times and..."

"Bingo!"

"What on earth..."

"The stuck Ferris wheel on one hand and the clown with the camera taking shots on the other hand implies that there is something that could be seen only from above and the lucky ones that have photographed the Luna Park from above could see the 'three religions' if they are smart enough, of course."

"Smart like us," smiled Dina, "But seriously, I think that you are totally out of your mind, Jobby?"

"Have a better idea, Din?"

"Then let's try it. What lucky we were to take our cameras with us."

They carefully analyzed their photos taken from the wheel, one by one, for a while and after that they used a photo editing software in order to enhance contrast and apply effects and even converted the photos into heat maps, maybe that way will be easier to see something meaningful, but to no avail.

"Look," said Joab suddenly pointing to a picture shot by Dina depicting one of the wheel riders.

"This one with the big black cap," pointed Joab with his index finger.

"Oh my, the man with the mustache again, but instead of his white cap he wears a black one."

"Strange enough," said Joab, "he's always after us, but maybe it's only a mere coincidence. Dimona is a small place, you know. Let's go on with the photos."

"All the pictures are cluttered with glittering and flickering lights, how on earth are we supposed to see something?"

"Exactly, Din, flickering lights."

The Science Fair

"What?"

"If the clue is some flickering lights in a specified pattern then it's clear that you must be lucky enough to see something in a still photo. If the lights are flickering in the same time maybe, but if they flicker, say, one after another then only a video can help us."

"It makes sense."

"Do you have one, by chance, Din?" said Joab hopefully, "I have only still pictures."

"I don't know," said Dina skeptical, "I was so frightened by the clown that everything is possible."

Dina quickly checked her camera for videos and to their relief she found a few of them.

Now they analyzed the videos for a while and were able to identify some flickering patterns.

"Let's see if there is a 'religious' pattern."

They stopped the videos at different points and pored intently over them.

"This pattern looks familiar," said Dina suddenly.

"What exactly, Din?" said Joab hopefully.

"Those light dots form some triangles." Said Dina pointing to her laptop screen.

"Here?"

"Exactly Jobby, these small triangles, six at all, and this big one, and this one upside down, see?"

"Six triangles...six triangles...upside down...so familiar..." Joab was thinking aloud.

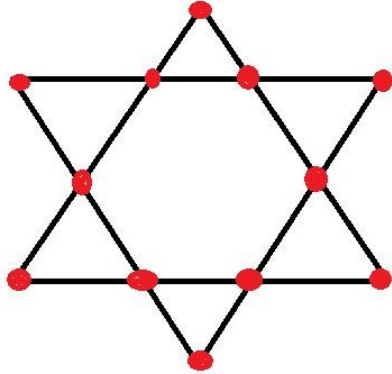
"Crystal clear, Jobby!"

"What on earth..."

"How have I missed it...how..."

"Then tell us clever Einstein." Urged Joab hopefully.

"The Star of David, meathead."



"Wow, Din, you are a real genius."

"Let's see what Wikipedia has to say about it."

=====

The Star of David, known in Hebrew as Magen David is a generally recognized symbol of Jewish identity and Judaism. Its shape is compounded of two equilateral triangles one of them upside down. The Star of David has been in use as a symbol of Judaism since the 17th century when it was used on Jewish flags. Its use probably derives from medieval (11th to 13th century) Jewish protective amulets.

A Star of David, often yellow-colored (yellow badge), was used by the Nazis during the Holocaust as a method of identifying Jews.

The flag of Israel, is depicting a blue Star of David on a white background, between two horizontal blue stripes.

=====

"We have got the first religion," rejoiced Joab, "It's Judaism."

"What about the second one?"

"It's obvious that for Christianity we have to look for a cross. Where on earth can we find one?"

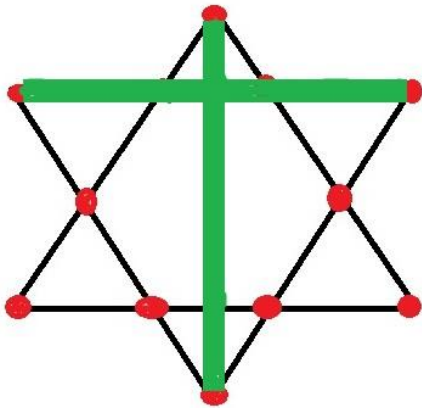
"Easy as ABC, Jobby."

"Then tell us clever Albert."

"Inside the shield of David by using the same light points you can form a few crosses at your will."

"I don't understand a word, Din."

"Look thickhead."



"Wow, Din, you are a real genius."

"I know...I know..."

"Let's see what Wikipedia has to say about it."

=====

The Christian cross, seen as a representation of the instrument of the crucifixion of Jesus Christ, is the best-known religious symbol of Christianity.

The crucifixion of Jesus is an event that occurred during the 1st century AD. Jesus, who Christians believe is the Son of God as well as the Messiah, was arrested, tried, and sentenced by Pontius Pilate to be scourged, and finally executed on a cross because of allegedly royal aspirations.

=====

The Science Fair

"Okay," Joab summed it up, "The first religion is Judaism, the second one is Christianity and if we are going on with the same line of thought the third must be Islam."

"Do you know, for a change, what the symbol of Islam is?"

"I don't have any idea Din."

"Then let's google 'symbol Islam.'"

=====

Today the star and crescent is a recognized symbol of the faith of Islam since it represented, during the 19th century, the Ottoman Empire, and today is depicted on the flag of the modern Republic of Turkey and on other Islam states flags as well.



=====

"What on earth is a crescent?"

"I don't have the slightest idea."

"Let's google."

=====

The word 'crescent' refers to the curved sickle shape of the lunar phases where the moon is less than half illuminated.

=====

"Okay, we know what's a crescent," said Joab thoughtfully, "but what on earth it has to do with the Luna Park."

The Science Fair

"Crystal clear," said Dina excited.

"Then tell us clever Albert."

"Well," said Dina full of her own importance, "in the definition is mentioned 'the lunar phases' and far as I know 'lunar' means something related to the moon hence the crescent...moon...lunar...luna...Luna Park."

"Wow, Din, you are a real genius."

"The third religion, namely Islam, Jobby, couldn't be found physically in the Luna Park but in its name."

"Let's see what Wikipedia says about this."

=====

The first to use the name "Luna Park" was the amusement park at Coney Island, Brooklyn, New York City that existed from 1903 to 1944. Among others, it included a wildly successful ride called 'A Trip to the Moon'. The name of the winged spacecraft (which was not a rocket, but flapped its wings) was Luna, the Latin word for the moon. 'Luna' gave its name to this park (Luna Park) and to dozens that followed over the next century.

=====

"But where on earth is the star," said Joab, "The symbol of Islam is a star and crescent and not a crescent alone, isn't it?"

"We have already the Star of David, haven't we?"

"So everything is settled down," Said Joab satisfied, "The 'one clue' is the stuck wheel and the clown and the three religions are Judaism, Christianity and Islam".

"Wait a minute Jobby," said Dina, "'one' is 'one' and the stuck wheel and the clown are 'two' so it looks more that the clown is only some coincidence of inspiration and he or she should be omitted from our answer."

Joab nodded his agreement.

The Science Fair

"But I don't understand something," said Dina, "How Solar Desert stopped the wheel in order to supply the clue."

"Probably they paid the park's operators to stop it, don't they?"

"Maybe, but I wonder, who the clown might be?"

The Fourth Riddle

The three switchgrass plants were gently swaying in the summer wind in front of a beautiful blue sky.

Since the fourth riddle looked, at first glance, very tough to solve, Joab and Dina decided to take first the readings for the third week observations of their experiment and to try to solve the riddle later.

The trend that emerged after the second week observations intensified. The supposed engineered switchgrass plant slowed down its growth rate whereas the supposed ordinary switchgrass did a little better. But the plant of the unknown nature, that was transformed from the Energy Castles facility, developed very much.

"Very queer," said Dina, "the genetic engineered switchgrass, which is supposed to develop the most, develops less, almost the same as the ordinary one. But the unknown one is doing wonders."

"Maybe we confused the labels," suggested Joab, "And the unknown plant is as a matter of fact the engineered one".

"Impossible Jobby, I'm sure," said Dina, "but maybe this happened because we transferred the plants and our experiment is totally wrong."

"Or maybe," suggested Joab, "the switchies belong to different cultivars. The lowland and upland switchgrass cultivars have different growth capabilities, remember?"

"An interesting idea," said Dina, "but for this we'll have to consult Professor Spike."

"You are right again."

"Maybe next week we'll know better."

"Then let's solve the fourth riddle in the meantime."

=====

What do the following items have in common?

The Science Fair

1. 1981-2012
2. Solar Energy
3. Energy Conservation
4. Geothermal Energy; Global Warming; Solar Energy
5. Energy Resources in Israel
6. exemption from payment

=====

After a few minutes, Joab summed it up, "Items 2-5 are something about renewable energy, as expected; item 1 looks like a range of dates like in the biography of somebody very important, maybe one that invented many renewable energy inventions and item 6 looks totally not belonging to the first five."

"It looks to me," said Dina, "that since clues 2-5 are capitalized, it hints that maybe those items are titles of something, and that's different from clue 6 that is not capitalized and it looks more like a definition of something and not a title."

"Since the fifth clue is about Israel," said Joab, "the meaning is that if we are talking about a person maybe he's Israeli, and besides, if this is really a person then he died very young, at 31, and it's not making sense that a such young person has so many achievements."

"Don't forget professor Spike for a moment," said Dina, "as mother says, so young and so talented."

Dina mimicked her mother, her hands on her hips, "It'd be better for you, Joab and Dina, to follow his example rather than that...whatever..."

"Brilliant," said Joab satisfied.

"Don't tell Mom."

"But it's also possible that our guy is really old and '1981-2012' is not related to his age but rather to his scientific career."

The Science Fair

"Possible."

"And look at the fourth clue," said Joab, "it's comprised of three different items and this may suggest that maybe those items are somehow related."

"The best to start," suggested Dina, "is to google "1981-2012" with "renewable energy" or "energy" and maybe we are going to discover an energy genius."

"Let's do it."

But to no avail.

"What could be the meaning of 'exemption from payment', Din?"

"I don't have any idea, Jobby, maybe only that we pay for energy and renewable energy saves money and exempts us from more payments."

"At least you have a developed imagination," said Joab smiling.

"Then let's google it."

"Nothing."

"Then let's google all six clues in any possible combination and see what happens."
Said Dina.

To their disappointment, no meaningful search results were displayed on the screen.

"No breakthrough."

"The fourth riddle is very tough," complained Joab.

"Today Mom and Dad celebrate Auntie Bertha's birthday, and maybe she's going to give us a hint as it was with the Bible."

"Miracles happen only ones, Din," smiled Joab, "she's not as smart as she thinks."

"Do we have any other choice, Jobby?"

Auntie Bertha's Birthday Party

Joab and Dina's mother opened the front door to greet their visitors with a big grin on her face.

"Hi, kids!"

Their grandpa lifted two colorfully wrapped boxes in the air. Ami and Tammy ran to him, standing on tiptoe to reach their grandfather's extended hands. They snatched the presents and joyfully disappeared into their room.

"Candy again?" their mother protested.

"You think they need me for books?" Their grandfather laughed.

"Books are educational!" their mother pointed out.

Hagar appeared sitting in her wheelchair, on her lap a big battered doll as always.

"How are you, darling?" their grandmother asked, hugging her and taking a little doll from her pocket that she put next to the one Hagar was holding. The little girl clasped it to her chest and went, like the twins, to her room.

Suddenly, the kitchen door was thrown open and Joab, Dina and Blacky rushed in.

"Hi, Grandma! Hi Grandpa!"

Blacky scampered around for a while but when Grandfather threw him a big plastic bone, he settled down contentedly.

Grandmother pulled a flat gift-wrapped package from her bag and held it out to Joab and Dina. "That's for you, my darlings."

"Thanks." They ripped it open.

"I'm sure you'll love it."

"More useless books, what for?" Their grandfather laughed.

It was a book about renewable energy.

The Science Fair

"I heard you are interested in renewable energy," Grandmother said.

"This is great!" Joab winked at Dina.

"Jobby wants to be smart," smiled Dina.

"Why not?" their mother said. "If Jobby would only concentrate on his schoolwork...instead of all of this cops and robbers stupid games."

Now Grandfather pulled another flat gift-wrapped package from behind his back and held it out to Joab and Dina. "That's also for you, smart kids."

"Thanks." They ripped it open.

It was a book about stamp collecting.

"Do you collect stamps, kids?" asked their grandpa with interest.

"Noooo...but we are going to begin," Dina said willing to satisfy him.

"It' a wonderful hobby, kids," he said.

"But you said books are useless" their grandmother said in amazement.

"This book is different," said their grandfather mysteriously, "and very useful of course...you'll see kids."

"What do you mean by that?" asked Joab with interest.

"Wait and see darlings."

Their father appeared in the living room. "What about my present, Grandma?"

"I remember we bought your father a wooden horse when he was three years old, and how cute he looked when he fell off it and..."

"That's enough," Grandfather said with a smile. "Even Blacky has heard the story at least a hundred times."

"But I haven't," Father said, putting his arm around his mother's shoulder. "Tell me."

Suddenly Aunt Bertha shot into the room. Not only was her hair dyed red, but her clothes, shoes and handbag were also red.

The Science Fair

"Hi!"

Blacky leaped on her.

"Down, boy!"

"You ought to be ashamed of yourself!" Dina reprimanded him, and Blacky went into a corner to gnaw on his bone.

"Rumor has it, Bertha," Grandfather laughed, "that you are soon switching back to blue."

"You old horse..."

Grandmother went into the kitchen to help Mother get dinner on the table, and Aunt Bertha sat down on one of the couches. She took out a big red pipe, lit a match, held it up to the pipe and inhaled deeply.

"Please Bertha, you're welcomed to smoke outside on the terrace, you are chocking all of us," said Grandfather wincing and waving the smoke away with his open palm.

"Okay...okay...I'll stop for now."

"So, Bertha, what do you think about the energy crisis?" Grandfather asked.

"Well," Bertha said puffing on her pipe again, "the world is going to solve it this way or another."

"Like how dear Einstein?" said their Grandfather knowing that it was useless to argue again with Bertha about her smoking.

Joab and Dina pricked up their ears.

"I haven't been idle like you, old horse. I have already studied the subject."

"Go on, know it all."

"At the end," Bertha said, full of her own importance, puffing again, "they are going to make cheap ethanol fuel from switchgrass."

Joab and Dina were listening with interest.

The Science Fair

"But how, clever Einstein?" their grandfather asked amused.

"By improving photosynthesis efficiency, of course, old horse."

Joab and Dina exchanged meaningful winks.

"But how?"

"Tomorrow is the science fair event, you'll see old horse."

"At your age...ha-ha-ha...a science fair contest...ha-ha-ha..." their grandfather laughed heartedly all his body shaking.

"You'll see old horse...you'll see."

"And what about your fair project kids?"

"For now not something," said Dina disappointed.

"I really don't know what exactly photosynthesis efficiency is," their grandfather said, "but I bet that you haven't solved the fourth riddle."

"One might think that you did old horse...ha-ha-ha..."

"He who laughs last, laughs best," said their grandfather mysteriously.

"Well...well...well," said Bertha deriding.

"What do you mean by that Grandpa?" said Joab and Dina hopefully in unison.

"Exactly what you hear, darlings," he said looking satisfied at the unbelieving Bertha.

"Then tell us old horse," said Bertha puffing her pipe nervously.

"Please Granddaddy," pleaded Joab, "only a few hours remained to the dead line, please."

"Well," said Grandpa pleased, "the key to the riddle is the last clue, namely 'exemption from payment', think a little bit, my darlings, about something or a service that you can pay for it before hand and you don't need to pay for it when you use it and it can be even a long time after."

The Science Fair

"Oh you old horse, stop this gibberish of yours, go to the point if you have one," said Bertha impatiently.

"You can try to use your brain for a change, Bertha," smiled Grandpa.

"What we can pay before and use after...use after..." Joab was thinking aloud.

"Stamps," said Dina suddenly, "It's crystal clear that you can buy a stamp or a stamped envelope and use it whenever you wish; you don't need to pay to the post office again for the delivery. It's very convenient that way."

"Bravo girl," said Grandpa satisfied, "the fourth riddle is about stamps. Before the introduction of postage stamps, mail was delivered and paid for by the receiver. This led to a variety of problems such as when the receiver was unable or unwilling to pay for the delivery service. It also allowed misuses of the system such as senders delivering pieces of mail just to annoy the receiver and making them pay for it at the same time."

"Like spam," said Joab.

"Exactly!"

"But then, why wasn't the sender required to pay for the mail delivery instead of the receiver in order to solve the problem?" said Joab.

"You must understand kids that at those far times, before the invention of the postal stamp, mail charge was high and service was poor and many letters never reached their destination. The public felt that the post service would only make an earnest effort to deliver a letter if the post office had not yet been paid for it - hence the need to charge the receiver.

Then the receiver of a piece of mail could decide whether to accept a letter when he received it and to pay for it or not. This left room for sending hidden messages, encrypted in the addressee or the sender names and addresses, free of charge. This fraudulent practice was tempting since postages fees were very high at those times."

"Now I understand why you gave us a book about stamps," said Joab.

"You are a very smart boy, aren't you?"

The Science Fair

"Of course he is, but only when he sleeps." Said Dina, sneering.

"Ouch!"

"Have you heard about the word 'philately' kids?"

"No."

"Of course I heard," snapped Bertha unsatisfied with the course the discussion was taking, "philately is stamp collecting, old horse."

Grandpa, that was an avid stamp collector for many years now, said, "Philately is the study and collection of postage stamps. Philately involves more than just stamp collecting, but also the study of stamps and postal history."

"But there could be other things, as well," said aunt Bertha smugly, "that we can pay for them before and use after, like...like...buying a monthly pass and travel as much as often we like with the bus ..."

"Well," said Grandpa, "the word 'philately' is composed from two Greek words: 'phil' meaning an attraction for something, and 'ateleia', meaning exempt from duties and taxes to form 'philately', so the connection is clear, isn't it?"

"I have to admit," said Bertha unwillingly that you have a point here.

"I heard that there are worthy stamps, aren't they?" said Joab with interest.

"Of course darlings," said Grandpa, "The first adhesive postage stamp, the Penny Black, was issued in the United Kingdom in 1840, featuring Queen Victoria and "ONE PENNY" at the bottom, indicating the amount that had been pre-paid for the transmission of the letter to which it was affixed and as the name suggests, the stamp was printed in black ink. In mint conditions it may cost up to 3000 dollar today."

"Wow! 3000 dollars!" said Dina excited.

"But the Penny Black is not the most expensive one," went on their grandpa with interest, "there are some stamps that cost more than 1,000,000 dollars each."

"And you have one, Granddaddy?"

The Science Fair

"I would like to," he smiled, "but regretfully I don't."

"Okay, old horse," said auntie Bertha sneering, "It's obvious that you are a great philatelist, but what about the riddle?"

"Please kids," Grandfather said, "bring along your laptops and show the lady in red the riddle."

"You old horse."

=====

What do the following items have in common?

1. 1981-2012
2. Solar Energy
3. Energy Conservation
4. Geothermal Energy; Global Warming; Solar Energy
5. Energy Resources in Israel
6. exemption from payment

=====

"Okay," he began, "the sixth clue is settled down, agreed?"

"Agreed."

"The capitalized 2-6 clues are titles of Israeli stamps dealing with renewable energy, of course."

"I told you that these are titles," said Dina staring at Joab full of her own importance.

"And what about '1981-2012?'"

"All those stamps appeared between the years 1981 to 2012, Okay?"

"Then tell us old horse," said Bertha satisfied, "then why clue 4 consists of three stamps whereas the others only one."

The Science Fair

"Well," said Grandpa, "Stamps are not printed one by one but on sheets containing many stamps. Usually every sheet contains the same stamp but sometimes on the same sheet are printed different stamps. In our case, since the tree stamps comprise a series, the Israeli Postal Service preferred to print the three of them on the same sheet, for commercial and beauty considerations."

Bertha was about to say something when Mother came in carrying a tray full of cookies and two cups of steaming black coffee. Her eyes lit up with delight. She thrust a few cookies in her mouth and munched slowly, enjoying every bite.

"Oh...they're good, really good!"

"Well, Bertha?" said Grandfather taunting her.

Bertha inhaled again, munched another cookie and finally said, smiling, "bravo old horse!"

Dinner was served and after it was over their mother emerged from the kitchen with a big round birthday cake with red strawberries, of course, and six lit red candles on top.

The birthday party began singing "Happy birthday to you...happy birthday to you...Happy birthday dear Bertha...Happy birthday to you!"

Aunt Bertha blushed satisfied puffing on her pipe vigorously and her face was soon shrouded in thick smoke.

"Stop it, Bertha," pleaded their mother, "you are going to choke all of us."

But to no avail since Bertha was really excited when the presents were brought into the room. Grandfather gave her, wide smiling, a red horse; mother gave her a red scurf; Joab and Dina put before her on the table a Red Riding Hood figurine; Hagary gave her a big red doll and Blacky brought to her foot a red rose.

"Thanks you all...thanks you all," Bertha kissed them all with pleasure, even Blacky.

The adults had wine and a few chasers when suddenly the joyful red-faced Bertha produced a white mask with a big black nose from her handbag and put it on her face.

The Science Fair

"What on earth...wait...you are the clown auntie?" said Dina astonished.

"Yep," Bertha said joyfully waving at them as she did on the wheel.

"Thanks helping us solving the third riddle about the three religions," said Joab gratefully.

"Helping us? What are you talking about kids?"

"Well," said Joab confused, "It looked like you attracted our attention with your camera in order to hint us to take some pictures of the Luna Park from above, didn't you?"

"Not at all, kids." Bertha said, "Since I was not able to find any useful clue on the ground I decided to take the ride and look for clues from above."

"And you solved the riddle, young lady?" said Grandpa skeptical.

"Yep, of course," she said sticking her tongue out at him.

"Good for you Sherlock Holmes," smiled their grandpa.

The TV announced its short News in Focus program.

"Shhhh!" Their father turned up the volume.

=====

China's Energy Crisis:

China is now the world's largest energy producer, generating 90 percent of energy it consumes.

When a country, like China, with the largest population in the world, steers into an era of industrialization and urbanization, this gap between energy demand and supply can arouse serious energy concerns.

China is now the world's second larger consumer of petroleum products after the United States. Most of China's energy generation is based on coal that is the main cause of the rapid increase in its greenhouse gas emissions, now the world's second largest after the United States.

The Science Fair

In order to secure China's huge energy demands in the future and also to address environmental concerns, especially to cut its greenhouse emissions, in order to fight climate change, China is working cooperatively with many countries to develop more advanced renewable energy technologies for various sources of energy, including wind power, solar energy and ethanol fuel.

Furthermore, the Chinese government decided to invest in promising high-tech renewable energy companies around the globe.

It was hinted by some high ranking Chinese Energy Department officials that two of this companies might be Solar Deserts and Energy Castles from Dimona.

A Chinese scientific delegation is due to arrive next week to Dimona to visit the facilities of the two companies involved in order to evaluate the progress made in developing energy switchgrass crops for ethanol fuel production and solar energy generation using solar power towers.

To other issues:

The fourth riddle of the treasure hunt game sponsored by Solar Deserts was solved by 22 hunters. The solution is the Star of David, the symbol of Judaism; the cross, the symbol of Christianity; and the star and crescent, the symbol of Islam. The three of them are dwelling peacefully in the Luna Park in Dimona.

=====

"Isn't that something!"

"These companies really deserve it," their mother said with admiration. "If only Dina and Joab followed their example..."

"Good for them!"

"Let's email the fourth riddle solution, Jobby."

"We have to prepare our science fair project ASAP, for tomorrow!" Joab whispered anxiously in Dina's ear ignoring her suggestion.

"Did you say something, Jobby?" their mother said.

The Science Fair

"No...nothing at all, Mom."

The Science Fair Event

For students, teachers and parents the science fair event is a high day reflecting the daunting scientific work done for long months in anticipation for the winning award. Some students always win due to their talent, parent help or financial investment, whereas others never win, and for those the event is a lasting frustration.

The science fair event took place at the Dimona Cultural Center in the same hall as the chess simultaneous exhibition did.

The large hall was cluttered with colorful display boards of all sizes and shapes, experiments, devices, scientific models and other exhibits mounted on desks creating makeshift booths.

The hall was illuminated with strong lights and a background pleasant music filled the hall.

In the front of the exhibition was located a high podium for distinctive guests and a mike on a stand for the presenter of the evening. On a long desk, besides small signs denoting the guest names and titles, were provided refreshments and treats in an aesthetic manner.

Above the podium was a big sign:

The Great Renewable Energy Science Fair
Sponsored by Solar Deserts
A Leading Solar Energy Company

It was very easy to identify the judges since they were moving from project to project taking notes, holding their tablets in front of them, and asking the young scientists questions with a serious look on their face.

The place was crowded with proud parents, teachers, school principals, guests, the head of the municipal education department and even the mayor was present. But what was surprising was the fact that also many journalists were present with mighty video and still cameras hanged on their neck.

The Science Fair

It was not surprising that even inspector Amos was present since his son Nir participated in the fair contest but the fact that he appeared in his police uniform was a little bit unusual for the civil circumstances.

Auntie Bertha was also present in red from toe to head trying to impress the judges passing by her booth. Normally, science fair contests are meant for K-12 school students but this time because of some public protest the contest was opened for adults also including college students. Besides Aunt Bertha, two more adults enrolled the challenge.

The competitors were busy with their projects trying to make the most of them by making them to look as attractive as possible, answer to questions asked by the audience and do their best to impress the judges.

Joab and Dina were also busy with their project so they did not engage in small talk with others and even Nir did not try to approach them with a sneering remark of his since he was occupied with his own project.

Sniffy was alerting like mad and since so many people were present, it was useless to watch out for suspects, so Joab preferred to switch it off.

At six o'clock sharp, the background soft music stopped and the event began.

The presenter, a young energetic man, welcomed the competitors, families, teachers, school principals and guests and invited the dignitaries to take their seats by the head table.

The event speeches began.

The first was Mr. Levi, the CEO of Solar Desert and the sponsor of the evening. He mentioned the importance of renewable energy to the future of the world but mostly spoke about his company's achievements and proudly announced that in the hall was present Mr. Ling Tao a representative of the Chinese Government Energy Department who had come to visit his company and he solemnly invited him to join the head table.

The Chinese guest bowed and smiled humbly towards turned heads and took his place next to the other dignitaries.

The Science Fair

The second was the head of the municipal education department which elaborated about his department's and the local school system's big achievements in the fields of science education but especially in the field of renewable energy.

The last was the mayor who told proudly about his town nomination to governmental important green awards and mentioned the recycling bin revolution his town undertook and the fact that many roofs of municipal buildings were covered with efficient solar panels.

After the mayor finished, the presenter encouraged the guests to visit the fair booths and announced that the prizes will be announced in one hour sharp.

The background soft music came back again and the guests swarmed between the projects.

At eight o'clock, the presenter gathered the audience for the award ceremony.

The science fair contest was divided into the three usual categories: elementary school, middle school and high school and an open category was added mainly for adults and college students. In each category were awarded six prizes.

In the elementary school category, a fat boy won the first place award for a project titled: How do size, angle, and temperature affect the output voltage of a solar panel? The boy ascended proudly to the podium applauded by the audience and especially by his proud family, teachers and friends. The boy was handed an award certificate and a check of 1000 shekels. He shook proudly hands and left the podium.

So went the ceremony on when in the middle school category a girl won the first prize for a project titled: Does temperature affect the performance of a fuel cell?

In the high school category, two girls won the first prize for: A novel and efficient method to derive ethanol directly from grass.

Joab and Dina rushed interested to the exhibits of this project to check it out but they were not the only ones to do so.

In this category, Danny won the fourth place and his mother who applauded her son noisily was prouder than ever.

The Science Fair

Since in the adult and college category competed only three candidates, all of them got an award, and among them the satisfied aunt Bertha which landed at the second place.

Now was announced the best project of the evening.

A spectacled shy boy about thirteen went to the podium and elaborated about microbial fuel cells, accompanied by a nice slideshow, explaining the audience about a novel method he developed in order to generate energy from waste.

He answered some spontaneous questions from the audience and some more invited from his mentor. He got his award certificate, a gold medal, handshakes and 1500 shekels.

Standing ovations.

When people began their way to the exit since the event looked finished, the presenter announced suddenly, "dear ladies and gentlemen, we are not finished yet, and as a matter of fact we even haven't started the event. Please, stay with us!"

Joab's and Dina's Project

"The next project is not the best one but certainly the most important." The presenter said.

Eyebrows were raised in curiosity.

"I'm pleased to invite to the podium the owners of the Science Gumshoes Detective Agency, Joab and Dina."

Cheers and hand clapping stormed up and Joab and Dina ascended to the podium.

"But there is a third partner to this detective agency."

Dina inserted two fingers in her mouth, a shrill whistle was heard and in a few seconds Blacky emerged from a rear room and sat panting by Dina's left leg staring inquiringly at the crowd.

"Don't tell me," said somebody joyfully from the crowd, "that the dog designed the experiment."

"Woof! Woof! Barked Blacky at him.

Some giggles were heard from the crowd but most of the people present in the hall looked surprised feeling that something unusual is taking place because at least twenty journalists appeared from nowhere thrusting mikes in the faces of Joab and Dina, asking endless questions. Still cameras clicked, flashes flashed and buzzing TV camera were taking videos of the podium.

"Please, leave the podium!" demanded the presenter resolutely.

After arguments, the journalists moved away from the podium and waited in anticipation.

"Please, Joab and Dina" said the presenter seriously.

They told the audience that they established their detective agency a month ago. Their first job was to find a little lost dog by the name of Jojo who was owned by Mr.

The Science Fair

Daniel Cohen. They found it quickly and were paid one thousand Shekels, a great sum for a small one-day job.

"Good for you," somebody said from the crowd.

They went on and said that they suspected that they were 'helped' to find the dog and the large payment was intended to encourage them to go on with their detective agency.

"What for?" asked an impatient journalist.

"Please don't interrupt, the answer will follow," said the presenter firmly.

Now came the second job that was offered by Mr. Isaac Levi the CEO of Solar Deserts from Dimona - a renewable energy company specializing in developing energy crops for cheap ethanol fuel production. Their mission was to find out who was behind the unfavorable articles published about Solar Deserts in the media and around the web recently. The only suspect that Mr. Levi had on his mind was his main competition, Energy Castles – another renewable energy company located in Dimona. They were offered four hundred shekels per day plus expenses and were paid weekly even though they have not accomplished much. Here was the place to mention that according to Mr. Levi himself, he and Mr. Cohen were friends but actually they were partners.

The hall was getting silent since there was a feeling of a mystery hovering in the air.

Joab and Dina went on and told the audience, blinded by the flashing cameras, that there were actually some unfavorable articles in the media about Solar Desert but the more important ones were clearly favoring it.

"How did you know which articles were the most important?" asked an old journalist.

"Because of dear Sniffy," said Dina.

"Ow...ow..."

Giggles all around.

"Sniffy who?"

The Science Fair

"Please, don't interrupt unnecessarily." Requested the presenter firmly, "I promise that there will be in the end enough room for questions, be patient."

"Please go on, Joab and Dina"

They went on and said that they had a feeling that this job also was not a real one and that they were not able to point to those that were behind the malicious articles because such a mission is behind the abilities of two children.

Then Joab and Dina explained that to their humble opinion Mr. Levi hired them knowingly that by hunting after the 'bad people' on the web two talkative children will rather spread the false idea that some bad guys are trying to harm Solar Deserts' reputation, and most importantly, as hinted by Mr. Levi himself, that Energy Castles is behind the slander.

"But what for?"

"Because," said Joab, "there were really on the web many unfavorable legitimate articles criticizing the scientific work done at Solar Deserts, especially the enormous impossible improvements in photosynthesis efficiency rates and Mr. Levi needed badly a counter campaign in order to satisfy the Chinese government that all those bad articles are spam and as matter of fact his company's inventions are sound. But more important, that Energy Castles, his competition, is not trustworthy because of their slanderous practices."

"But why had Mr. Levi a desire to satisfy the Chinese government?"

"Because," Dina said, "as all you heard, there is a looming energy crisis around the world and especially in China. And the Chinese government is willing to invest heavily in new promising renewable energy technologies in order to secure the future of the Chinese energy needs. And Mr. Levi wants to enjoy some of this investments, but if those malicious articles continue there are big chances he's going to be deprived of those funds because the Chinese government will come to the inevitable feeling that those articles are maybe right and there is a scam. A highly ranked Chinese delegation is due to arrive to Dimona soon, besides Mr. Ling Tao, and Solar Deserts and Energy Castles are fighting for the funds, and if Mr. Levi can remove Solar Castles from his way, better."

The Science Fair

"And more to it," added Joab excited, "Mr. Levi's tactics have some success now and the Solar Deserts stocks are on the rise on Wall Street, another source of cash and good reputation."

"But is there a scam, or not?" asked the presenter loudly.

A deathly silence prevailed when everybody was waiting Dina's answer.

"Yes there is!" said Dina.

A surprised uproar filled the hall.

"I'll sue you kids and your parents too," shouted the pale Mr. Levi.

"Grrrrr," Blacky growled suddenly at him.

The tension was broken for a moment and giggle were heard from every corner.

"Can you prove it?" asked the presenter resolutely.

"Of course we can," said Joab, "But before that we'd like to point to all the public relations tactics employed by Mr. Levi in order enhance his company's position as a leading high tech renewable energy company worthy of trust and respect."

"Go on, Joab."

"Mr. Levi employed two different campaigns in his efforts. The first as we said, was about discrediting the negative attitude about his company by spreading the word that some really bad guys, including Energy Castles, are after him, and for this he hired us and we are sure that he hired also others."

"He hired me also," chirped Nir raising his hand from among the crowd, "to do the same job as you did."

"And I'm sure," said the presenter, "that you didn't keep the secret of your mission to yourself and told the world and his wife that you are after the 'bad guys' that harm Solar Deserts."

"Well," admitted Nir perplexed, "not to the world and his wife but to some friends, I did. And here is the place to admit that I also was hired to find a dog."

The Science Fair

"And I bet it was a small beige Miniature Pinscher called Jojo," said Joab.

Nir nodded in agreement.

"Don't bother too much," Dina comforted him smiling, "a few words slipped also unwillingly from my mouth too, Facebook, Twitter...you know..."

Dina got a scolding look from Joab; more giggles.

"And the second tactics employed by Mr. Levi," went Joab on, "were good public relations especially in the business Chinese press."

"Dina, can you elaborate please," encouraged the presenter.

"The first thing," said Dina looking at a sheet of paper she was holding in her hand, "was the chess simultaneous exhibition where Danny and our aunt Bertha drew with Grandmaster Shmilovich. As it looks now this is impossible. We suspected that the honorable GM was asked politely to satisfy the crowd on the pretext that this can encourage others to play chess."

"How dare you to say," said Danny's mother moving angrily forward, "that my Danny didn't deserve his achievement. You envy him."

At this, aunt Bertha came forward puffing on her pipe nervously more than ever, even that this was not allowed in public, saying, "I think that Dina is right. I also suspected myself that something is wrong since the GM did at the end a few stupid moves, well..."

"Now, what more Dina."

"Then he sponsored the treasure hunt game. All the riddles are of an educational nature - about the Fibonacci numbers; the Biblical burning bush and renewable energy; the symbols of the three monotheistic religions in the Luna Park: the Jewish Star of David the Christian cross and the Islamic star and crescent; the fourth riddle about Israeli renewable energy stamps, and the fifth riddle is on its way. With the same tactics: published all over the media but especially in the influential China Business."

"But what for," guided the presenter the course of the discussion.

The Science Fair

"For good public relations, of course. Solar Deserts is sponsoring an educational chess event and the sensation there attracts more positive attention which is further enhanced by the treasure hunt game. Mr. Levi publishes all this in the China Business, the leading business paper in China, reaching all decision makers there, not wasting the opportunity to elaborate on his company's scientific achievements."

"But it looks quite queer that a business paper will publish about chess or a treasure hunt game, taking place in a little town in Israel, on a premium page."

"Maybe Mr. Levi has some partners there." Offered Joab.

"Very interesting idea indeed."

"We understand," said the presenter, "that Mr. Levi employed some media campaigns to disparage his critics on one hand and on the other to improve his image, especially in China in order to get some Chinese investments. But maybe he really has improved photosynthesis efficiency in switchgrass and his tactics are legitimate PR efforts done by many. Where is the scam, guys?"

Hearing this Mr. Levi's face gained its natural color again.

A big screen was erected on one of the walls and six vivid images of switchgrass plants appeared on the screen.

"Please Dina, what is this all about?"

"Our mission as requested by Mr. Levi," Dina began, "was to find the "bad guys" on the web. But since it looked from the beginning as a dead lock, then when we heard from our mother that at the farm, where she is a teacher, that there are two plots belonging to Solar Deserts, we went there, out of curiosity, at night and transferred two switchgrass plants to our garden, one from the control group that is supposed to be an ordinary plant, and one from the experimental group which is supposed to be a genetic engineered plant with improved photosynthesis efficiency."

"How dare you steal my precious plants? You brats!" protested Mr. Levi and Blacky, which till then was licking his paws peacefully, growled at him again applauded by the audience.

The Science Fair

"But," went Dina on squinting at her sheet of paper, "we transferred another switchgrass plant to our garden originating from a plot belonging to Energy Castles the company with the high tower and mirrors - Solar Desert's chief competition and the main suspects of Mr. Levi as the ones behind the negative articles about his company. We went there on a guided tour and Blacky went astray, and we went after him and saw the switchgrass plot and well...transferred another switchgrass to our garden. Since the plot wasn't marked, this plant was to us of an unknown nature."

"Dear Blacky," said Dina patting his back with affection.

"Those kids are thieves and should be locked in jail and the key should be thrown away," protested again Mr. Levi.

"I don't think so," said a tall young man, "as a matter of fact I'm very curious to hear about the experiment results achieved by those young adults."

"Please, introduce yourself," said the presenter.

"I'm Ron Brown, the CEO of Energy Castles, whom the last switchgrass plant, of the unknown nature, belongs and as a matter of fact I grant Joab and Dina my permission to use my plants for any purpose they like."

"Thanks Mr. Brown," said the presenter, "Dina, go on please."

"The purpose of our experiment," Dina began, "is to find out if Solar Deserts really improved the photosynthesis efficiency of their engineered switchgrass plants, in this case of that one that was transferred to our garden. Improved photosynthesis efficiency means a much more developed plant than an ordinary one - higher and thicker stem, more leaves and flowers, greater leaf area and greener leaves, etc. – with the same water and fertilizer input, of course.

"In order to clearly find out which plant thrived better over time we calculated the Plant Development Index (PDI) - meaning, averaging all observation readings, for each plant, into one single number.

"As you see," Dina went on pointing with the mouse cursor on the screen, "the upper row consists of three pictures of the three plants a week after we transferred them to our garden. During this first period, we irrigated the three switchies lavishly everyday

The Science Fair

and at the end of it, when it was clear that they had overcome the transfer trauma, we set the experiment baseline or PDI for the three plants at this point. For convenience, we set the three initial PDIs at 100, but we could also set them at any other convenient number of our choice, as well.

To begin from PDI=100 was very logical to do even though at the beginning the switchgrass plants were different in size but we did not have any idea when exactly the plants had been planted or seeded. So from then on, our observations were meant to reflect not the plants' absolute development stage but rather the extra development or growth rate gained relative to the baseline of 100 in percents.

After the first week, we irrigated the three plants, for a full month, only two liters twice a week to find out which is the toughest one for desert life. We took observations weekly.

"Below the upper row are the same three plants photographed a month later. As you see, at the beginning the engineered supposed one was much more developed than the ordinary one as expected and the plant of the unknown nature was somewhere in the middle.

"But a month later," said Dina excited, the mouse cursor wandering on the screen again, "you all can clearly see that the supposed ordinary plant and the supposed engineered plant developed further approximately at the same rate but the unknown switchie, from Energy Castles, developed at a much higher rate by far than the two switchies from Solar Deserts.

To sum it up look at the following table:

Switchgrass	Origins	Baseline (PDI)	After a Month (PDI)
ordinary	Solar Deserts	100	112
engineered	Solar Deserts	100	110
unknown	Energy Castles	100	217

"Please, Joab," said the presenter smiling, "Let your sister to refresh herself a little bit and tell us what the meaning of this table is?"

The Science Fair

"The meaning of the table is," Said Joab solemnly, "That the only engineered switchgrass plant with improved photosynthesis efficiency is that of the unknown nature which belongs to Energy Castles and Mr. Ron Brown which is with us."

"It's crystal clear," added the presenter, "PDI of 217 versus 110 and 112."

Mr. Ron Brown smiled satisfied at a few people that stared at him with admiration and envy.

"And you imply that Mr. Levi's and Solar Deserts' plants are as a matter of fact ordinary ones without any enhanced photosynthesis."

"And that's the scam!" shouted a journalist.

Uproar of surprise filled the crowded hall and more cameras were clicking and flashing.

"But now Joab," said the presenter directing his look at him, "can you please explain to the audience how did Mr. Levi create the fictional development gap between the "engineered" plants and the ordinary ones in order to mislead us to believe that this gape is due to photosynthesis efficiency improvement."

"Very simple," said Joab, "on one hand he artificially enhanced the growth rate of the supposed engineered plants by using a hidden under terrain irrigation and fertilization system which we discovered by mistake when we dug around the switchgrass plant in order to move it to our garden. Moreover, they lit the plot at night with short pulses of light for a few minutes. We consulted Professor Spike and he told us that this is a known method to improve photosynthesis efficiency in plants.

"And on the other hand, Mr. Levi and his men artificially reduced the growth rate of the ordinary plants by little watering them and Professor Spike told us that he also slowed down the photosynthesis efficiency of the ordinary plants by placing them near tall pine trees, to the north of them, in order to shadow the plot and by that the sun light intensity needed for photosynthesis is reduced. Professor Spike also told us that pine trees are poisoning the earth for other plants and this also reduced the growth of the ordinary plants, whereas the supposed engineered plants were located some distance from the pines."

The Science Fair

Professor Spike nodded his head in agreement from the crowd.

"The experiment is totally invalid," shouted enthusiastically an old acquaintance, the mustached man with the white cap, to Mr. Levi's satisfaction, "You transferred the plants and this disturbed their normal course of development but more to it, the sample is too small, who heard about a valid experiment with only one plant and you also didn't do any repetitions...ah..."

"Well, Joab," said the presenter, "What do you have to say about this?"

"The man is totally right," admitted Joab looking furtively at a written piece of paper.

Three pictures of some small plants with yellow small flowers were projected on the screen.

"Those annual leafy herbs are called Garland chrysanthemum or crown daisy. They are smaller than switchgrass and since they are native plants here, they grow free in the wild and in the switchgrass plots, of course. One may expect that if Mr. Levi conducted his experiment correctly, meaning that the two plots, the experimental group and the control group, were irrigated and treated the same as required, the garlands should reach the same development and size now.

"But when we look at the pictures is easy to see that the garlands growing around the fictional engineered plants are much more developed that those that grow in the ordinary plot, what hints to different treatments – on one hand, the hidden under terrain irrigation system and the improvement of photosynthesis efficiency by pulses of light and on the other hand, the shading and poisoning effects of the pine trees.

"It's clear that Mr. Levi and Solar Deserts intentionally enhanced the growth rate of the supposed engineered plants and slowed down the growth of the ordinary ones. But if we suppose that the plants of the unknown nature, belonging to Mr. Brown, weren't unfairly manipulated in any direction, than their growth and development stage must reside somewhere in the middle between Mr. Levi's unfairly manipulated engineered and ordinary plants".

"If you look at the three garland pictures is very easy to see that the garlands from the third unknown plot are smaller than the "engineered" but bigger than the "ordinary" plants whereas the switchies of this plot are the biggest. And as matter of

The Science Fair

fact, the garlands from the third plot reached the same development stage as other garlands in the wild in Dimona. And this is another indicator that Mr. Levi employed some fraudulent practices to manipulate his plants.

"And as a matter of fact the garlands serve as a control group of the nature"

The presenter invited Professor Spike to the podium to further elaborate on some scientific aspects of Joab's and Dina's experiment.

"You must understand," said Professor Spike, "that Joab's and Dina's experiment is limited and many important issues are outside its time frame and resources. Bigger samples should be tested, and the transfer issue should be avoided."

"It's totally clear that Ron Brown and his Energy Castles improved significantly the photosynthesis efficiency of their plants. More biomass is a good thing but not always enough for much more efficient ethanol fuel production. For this, in further experiments, we'll need to find out if these plants enjoy a different structure of their cell walls that will require less energy to break them down into cellulose in order to convert it to sugars and the sugars to cheap ethanol."

Another issue is the possible use of the engineered switchgrass plants' biomass for direct combustion in the form of energy pellets for home, industry and for fueling power stations for electricity generation.

"For this, in further experiments, we'll have to evaluate the dry material - which is the remaining material after water and moisture are extracted from the biomass - for its percentage from the total biomass, its caloric content and green burning quality.

The presenter thanked Professor Spike and faced Joab and Dina, "you two did a wonderful Job, with the help of professor Spike of course. But the question remains, if you discovered the trick, logic says that the Chinese government which has at its disposal vast scientific resources will also, and the meaning is that the trick devised by Mr. Levi and Solar Deserts won't work, will it?"

"Unless," Joab replied, "Mr. Levi has an accomplice, a partner inside the Chinese government that can convince them to invest in Solar Deserts and not in Energy Castles, for example."

The Science Fair

"And who this one can be?"

"Mr. Ling Tao that is with us!" said Joab pointing at his direction.

The simultaneous translator did not finish to translate Joab's last sentence to Mr. Ling Tao because four plain clothed Chinese police officers from the Beijing Economic Crimes department leapt quickly on the podium and after short explanations the astonished Ling Tao was handcuffed and vanished from the hall on his way back to China.

At the same time, Inspector Amos approached the pale Mr. Levi and with the help of the presenter, which leapt from the podium into the crowd, and the mustached man with the white cap, which both of them proved to be plain clothed Israeli police officers, arrested and handcuffed him, and transported him in a police van to the Dimona police station.

The crowd was petrified in the face of the dramatic events. Journalists swarmed in the direction of Joab and Dina for interviews with clicking cameras in their hands and mikes thrust in their faces.

A few uniformed police officers, instructed by Inspector Amos, ushered Joab, Dina and Blacky into another police Van and drove them to a hotel outside the town to spend the night.

In the lobby waited for them their mom and dad, grandpa and grandma, the twins Ami and Tammy and the little Hagar in her buzzing wheelchair and aunt Bertha.

"We all are so proud of you!" said their mother agitated kissing them on their chicks; the others followed and Hagary even gave them her doll while the twins and Blacky were chasing merrily after a ball all over the lobby with ear-splitting shrieks.

"If you have a vacancy at your detective agency," said Auntie Bertha hopefully, "and you need a really talented partner, I'm ready kids."

"Sure, Sherlock Holmes," laughed their grandfather.

"You old horse..."

The End

The Science Fair

The Science Fair

A Juvenile Science Adventure Novel

By Julian T. Rubin

julianrubin2000@yahoo.com

The Science Fair

Joab and Dina - thirteen and twelve years old - live in a little town in Israel. In the holidays, they solve scientific detective mysteries with the help of their German Shepherd dog - a hobby that their mother dislikes.

This time they are engaged in a mystery that involves a few interrelated scientific hot topics like ethanol fuel, solar energy, genetic engineering and photosynthesis.

The mystery is about the race between two renewable energy companies to be the first to invent a new promising technology.

On their way, they find a lost dog, compete in a chess tournament, investigate a deserted farm on a dark night, participate in a treasure hunt game and are stuck on the top of a Ferris wheel at the Luna Park.

A science fair event is running in the background and at the end, when Joab and Dina present their project, everything falls into place and the mystery is unfolded.