

MEMORANDUM

DATE: January 29th 2009

TO: The helpful elves at Santa's Elves, Ltd.

FROM: Santa Claus, Lead Toy Developer and CEO
Santa's Elves, Ltd.

SUBJECT: Toy Car Contest

Greetings! Palm Springs is quite lovely this time of year. It's too bad I can't take you all down here to enjoy the weather with me, ho ho ho. Anyway, the holiday was a great success, this year. Thank you, again, for all your hard work.

This year, I am looking for a new toy car. I don't want a car made of interlocking blocks – that's boring and done-to-death. I am looking for something like the old cars that you elves used to make a long time ago. I'm not exactly sure what I'm looking for, so I thought a contest might make this easier on me – that way I can stay here on the beach and relax.

The rules are simple – the team of elves that produces a car that can travel the *farthest* and the *straightest* wins. I'm attaching a list of requirements below, and I thought the guys and gals from Sensis Corporation could oversee this whole thing for me while I kick back and drink eggnog.

1 Car Requirements

Here are the design constraints to keep in mind when designing and building your entry in the contest:

1. Cars **shall** weigh no more than 1 lb.
2. Cars **shall** be self-propelled.
3. Cars **shall** be no taller than 12 inches.
4. Cars **should** be no taller than 10 inches.
5. Cars **shall** be no longer than 12 inches.
6. Cars **shall** be no wider than 12 inches.
7. Cars **should** be no wider than 10 inches.
8. Cars **shall** bear the Sensis logo (of course).
9. Cars **shall** be only composed of items from the Material List (to be provided at Contest Kickoff).
10. All material cuts **shall** be made by students prior to the Contest Demonstration.
11. The cars **shall** not damage the floor during launch.
12. All team members **shall** remain behind the track launch boundary during and after launch.

13. Each car **shall** have a reference point applied to it by a member of each team, for scorekeeping purposes.
14. Each car **shall** be unmodified between launches, unless “bonus adjustments” are purchased.

I’m looking forward to seeing you all at the Contest Kickoff so I can answer any questions you have about these requirements. In the meantime, let me give you a preview of what will happen over the course of the contest.

2 Design Review

After a few weeks of working on your design, it should be well established and you should be confident that you can build a toy car that will win. This is a great time to get feedback on your design, so we will meet at Sensis in East Syracuse for a Design Review.

You will have the chance to score big money (in the form of credits – which I’ll talk about later) at the Design Review if your presentations are excellent. Being “truly ready” means:

- Being able to quickly and effortlessly build a prototype of your toy car. It may be helpful to have a mockup of your car at the Design Review, but this isn’t required. *Hint: A well-prepared team will bring a prototype to the Design Review.*
- Your design documentation is written very clearly so all the other elves can understand it. A messy, confusing design is never popular around the workshop, and usually results in toys that break or end up on the bottom of the toybox. A better design will earn you more credits for your budget.

Remember, my helpful elves, staying engaged and working hard will earn you more credits than if you complete your designs the night before they are due... So stay involved and have fun!

To complete a great design review you must satisfy the following criteria:

1. The design artifacts (slideshow and schematic) are well-written. The design artifacts will use proper English, be well proofread, and will be worded using simple language, so even the first-year elves can build the car without confusion.
2. Your team will prepare and present a design review slideshow. The design review slideshow will:
 - a. Summarize the problem you are trying to solve.
 - b. Identify the key areas that affect the performance of your design.
 - c. Describe how each of the key areas that affect the performance will be addressed by your design.
 - d. Identify at least three trade-offs in your design, and describe what your team did or plans to do to resolve the tradeoff.
 - e. Identify any risk areas in the design – For example, if you choose a very sophisticated propulsion methodology, how much will it weigh, and what would be the impact of a heavy car?

- f. Explain the management structure of your team.
- 3. Your team will prepare and explain a design schematic. Of course, only parts that were supplied through Sensis are allowed in the design, so no rocket engines or compact solar arrays.
 - a. The design schematic will be dimensioned in inches, and your contest prototype will follow the schematic as closely as you can make it. This means: no extra materials that aren't specified on the schematic.
 - b. The design schematic will contain all of the pieces of the materials used to make your car (including spares).
 - c. The design schematic will include clear assembly instructions.
 - d. The design schematic will be used in the inspection at the Contest Demonstration. I understand that the schematic may change between the Design Review and the Contest Demonstration. See section 4.1 for details about that.

3 Credit Management System

I am going to use a credit management system in order to keep an eye on how much it will cost Santa's Elves, Ltd, to manufacture the car. Each team will have a starting budget of 100 credits. You may earn more credits along the course of this project.

Here is a preview of what you can expect regarding Earning Credits

Category	Description	Credits
Starting Budget	100 credits are allotted to each team of elves at the beginning of the contest.	100
Design Review	Each team is scored on their Design Review performance. Teams can earn up to 25 credits for the Design Review.	25
Questions	There will be a total of three questions posed to the teams during the course of the contest. A correct answer to each question is worth up to 5 credits.	15

Here is a preview of what you can expect regarding Spending Credits. Details will be released no later than the Design Review.

Category	Description
Materials	You'll be charged credits based on how much of each material you use in your design.
Build time	Each minute of construction time to assemble your vehicle will cost a certain number of credits.
Bonus feet	See Figure 1 for a <u>notional</u> test track. Your starting position will be adjusted closer to the finish line (actually finish "point") based on the number of bonus feet that you buy.
Bonus adjustment time	As a risk mitigation, you may want to buy the opportunity to adjust or repair your car in between launches. This is the only way to perform inter-launch maintenance.

Category	Description
Schematic errors	You will be charged credits when you use a part that is not accurately captured in your design documents. Examples include missing parts, or parts that are not properly specified (such as the wrong length for a dowel).

4 Contest Demonstration Stage (Gameday)

4.1 Gameday – Stage 1: Inspection

All material cuts will be made prior to game day. You will arrive at the contest site with your design schematics and your pre-cut components. If you made updates to your design schematic after the Design Review, those updates must be clearly identified as redlines on your drawings.

Your design will be inspected to ensure that the design documents match the pre-cut materials. The result of inspection is that you have all of your materials ready to put together, and the judges have given you permission to begin construction. Penalties due to illegal materials and improperly identified redlines will be left up to the discretion of the judges at the inspection stage.

4.2 Gameday – Stage 2: Construction

Then it will be time to construct your vehicle. Remember, if your design documents are easy to follow, and you have practiced building your car, you should have no trouble building your demonstration car. There will be a half hour time limit to put your car together, but the less time you use the more credits you'll have left for other uses.

The result of construction is a completed car, which is submitted to the judges. If you are not finished constructing your car within the time you have purchased, you will receive a penalty for each additional minute needed. Remember to plan for construction mishaps. Also, keep in mind that spare parts need to appear on your schematic and must be purchased with credits.

4.3 Gameday – Stage 3: Contest Demonstration

Once the materials are inspected, and the cars are built, it will be time for your cars to make their trips across the track. The exact details of the track are not yet known. Expect it to be very long and level to accommodate your prototypes, and there will be markers that let the judges make sure that your cars are traveling in a straight line.

There will be as few variations in the floor as we can manage. The straighter your cars travel, the further you'll go and the more points you'll score. See a notional track example in Figure 1.

There will be lots of people there to cheer you on and to check out your great work. Your prototype will go through three trials, and each run will count toward your final score.

Figure 1. Notional Test Track Example – to be finalized by Design Review

