

SkillsUSA 2015 Contest Projects

Team Engineering Challenge

Click the “Print this Section” button above to automatically print the specifications for this contest. Make sure your printer is turned on before pressing the button.

2015 TEC Timeline

-tentative-

Wednesday, June 23rd:

8:00am	.	.	.	Contest Welcome
8:10am	.	.	.	Team Written Test - Problem Solving
8:30am	.	.	.	Collect Written Tests Contest Briefing
8:50am	.	.	.	Teams begin worktime
9:00am	.	.	.	TEC Store Opens
9:30am	.	.	.	Round 1 Purchases done (Limited supply) Following completion of Round 1 - Round 2, 3, & 4 begins First-come, First-serve on Rounds 2, 3, & 4
Noon	.	.	.	Day 1 Worktime Ends. Clean up areas, Leave ALL materials/supplies/prototypes in TEC area

Thursday, June 24th:

8:00am	.	.	.	Contestant Worktime in contest area TEC Store Opens
Noon	.	.	.	Lunch provided in contest area
2:30pm	.	.	.	Contestant Worktime ENDS Clean up area & leave TEC Room until Testing timeslot
3:00pm	.	.	.	Judging Begins 3:00pm - Team _____ 3:20pm - Team _____
4:00pm	.	.	.	Debriefing Begins 4:00pm - Team _____ 4:10pm - Team _____
4:30pm	.	.	.	Teams may pick up their supplies, materials, prototypes, etc TEC Contest time done - waiting for awards ceremony :)

Team Engineering Challenge

2015 - National Contest Materials
SkillsUSA
Louisville, KY

WAIT to open
until
Contest Chair gives permission

Contest Description

Your team works for “Wolenda HiWire Company” in Heights Ville, USA. Your team is tasked with designing and developing a scaled prototype for an autonomous delivery system. The potential client, SkillsUSA, has provided criteria, constraints and a scale test model for this system. Your job is to create a device that will travel 18 feet under power and deliver a cargo load (5 marbles) properly. The client has requested a test and presentation of your company’s solution on Thursday, June 24th. If awarded this job, Wolenda HiWire Company could be receiving some hardware.

Objective: Your team is to;

- Develop a plan for your prototype.
 - o Think about materials, effectiveness and your presentation.
 - o Include a Budget for your presentation.
 - o Create documentation for your pre-planning
- Develop your prototype. Construct, test, improve.
- Develop props, posters, models, etc for use in your presentation...
 - o No digital media is to be used in creating or presenting your product line.
- Test your prototype in accordance with the TEC Rubric with the judges.
- Present your prototype in accordance with the TEC Rubric to the judges.

Materials: Your team is ONLY allowed the building/design materials supplied by the 2015 TEC Contest Committee, located in the TEC Store. (you may use your team supplied scissors, exacto knife, rulers, protractors, calculators, writing and/or coloring utensils and scratch paper. Scratch paper is only for personal team notes).

- Your team received \$60 in Plastic Coins to begin today.
 - o Teams will NOT get additional coins, lost or stolen - no excuses
 - o IF a team is caught trading or stealing coins (or supplies) from another team, they will be disqualified from the 2015 TEC Contest.
- Supplies for everyone are in the TEC Store area and on your “Purchase Sheets”
 - o Each supply item has a cost associated with it (per item)
 - o Some items have limits on “how many per team allowed.”
- Your team is allowed 3 timeslots to purchase materials at no penalty.
 - o Time Slot 1: You have until 9:30am today to place your first order!
 - Any items that have “max/team” listed – you cannot buy more than that.
 - o Time Slots 2 & 3: after all 1st orders are received, you may order anytime
 - “Max/Team” items no longer matter. If we have extras of anything and you want to purchase them, you can. (First come – First Serve)
 - o Time Slots 4 - 8: A 10 point penalty will be applied to your TEC Score for each trip after 3 to the TEC Store.
- Placing Orders for supplies
 - o 1 team member from each team should be designated for ordering.
 - o Step 1: Complete your order form
 - (White for TimeSlot 1 / Yellow for TimeSlots 2-3 / Green for TimeSlots 4-8)
 - o Step 2: Bring your order form to the TEC Store and wait in line.
 - o Step 3: Follow the TEC Store Clerk in fulfilling your order.
 - o Step 4: Verify your order is correct as it is being fulfilled & Sign order sheet.
 - o Step 5: Pay for your order using the TEC Plastic Money
 - o Step 6: Take your supplies to your table - they are yours to construct with.

National TEC SkillsUSA Contest Guidelines (continued)

Committee Identified Academic Skills

The technical committee has identified that the following academic skills are embedded in this contest.

Math Skills

None Identified

Science Skills

None Identified

Language Arts Skills

- Provide information in oral presentations
- Demonstrate use of verbal communication skills: choice, pitch, feeling, tone and voice
- Demonstrate use of nonverbal communication skills: eye contact, posture and gestures using interviewing techniques to gain information
- Identify words and phrases that signal an author’s organizational pattern to aid comprehension
- Organize and synthesize information for use in written and oral presentations
- Demonstrate knowledge of appropriate reference materials
- Demonstrate understanding of skill

Connections to National Standards

State-level academic curriculum specialists identified the following connections to national academic standards.

Math Standards

None Identified

Source: NCTM Principles and Standards for School Mathematics. To view high school standards, visit: standards.nctm.org/document/chapter7/index.htm. Select “Standards” from menu.

Science Standards

None Identified

Source: McREL compendium of national science standards. To view and search the compendium, visit: www.mcrel.org/standards-benchmarks.

Language Arts Standards

- Students adjust their use of spoken, written and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes
- Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes
- Students use spoken, written and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion and the exchange of information)

Source: IRA/NCTE Standards for the English Language Arts. To view the standards, visit: www.ncte.org/standards.

National TEC SkillsUSA Contest Guidelines (continued)

STANDARDS & COMPETENCIES

TEC 1.0 — Perform effectively as team members

- 1.1 Demonstrate group problem-solving techniques
- 1.2 Demonstrate team proficiency in construction of a building project
- 1.3 Perform additional teamwork competencies as determined by the technical committee

TEC 2.0 — Wear appropriate clothing for the national contest

- 2.1 Display clothing that meets national standards for competition
- 2.2 Demonstrate good grooming in dress and personal hygiene

TEC 3.0 – Integrate knowledge of basic engineering principles into technical writing and presentations following the guidelines the contest technical committee has established

- 3.1 Apply engineering knowledge in the areas of force, work, rate, resistance, energy, power, force transformers, momentum, waves and vibrations, energy converters, transducers, radiation, optical systems

TEC 4.0 — Transform existing systems into conceptual models

- 4.1 Transform conceptual models into determinable models
- 4.2 Use determinable models to obtain system specifications
- 4.3 Select optimum specifications and create physical models
- 4.4. Apply the results from physical models to create real target systems
- 4.5 Critically review real target systems and personal performance
- 4.6 Design effective and usable IT-based solutions and integrate them into the user environment
- 4.7 Assist in the creation of an effective project plan
- 4.8 Identify and evaluate current and emerging technologies and assess their applicability to address the users' needs

TEC 5.0 — Showcase knowledge of project planning

- 5.1 Apply brainstorming techniques
- 5.2 Implement benchmarking
- 5.3 Discuss continuous improvement
- 5.4 Explain cause and effect relationships
- 5.5 Apply knowledge of customer satisfaction
- 5.6 Demonstrate how to collect data
- 5.7 Apply decision-making skills
- 5.8 Define and describe a process
- 5.9 Empower team members
- 5.10 Recognize methods of idea generation
- 5.11 Prioritize tasks
- 5.12 Reach consensus amongst the team
- 5.13 Display teamwork during the contest
 - 5.13.1 Have equal team participation
 - 5.13.2 Show positive group dynamics
 - 5.13.3 Define team roles

- Buy Backs. Did you mess up and order more than you needed??? We will purchase back your “in new condition” supplies at 50% original cost. (If you paid \$5 Plastic Coins – we will give you back \$2.50)
- Trading supplies with other teams is not allowed in TEC

Size:

- Your prototype may not be larger than 18” x 18” x 18”

Practice / Testing of your prototype during worktime...

- There is 1 test station for teams to use during worktime.
 - o This test station is the “Official Test Station” for TEC 2015.
 - o Teams are allowed unlimited practice trials on the station during Work Time.
 - o Teams must keep their trials to 2 minutes IF other teams are waiting in line.

Evaluation / Judging Criteria:

- Points will be awarded in accordance with the TEC Rubric in the Contest Guidelines.
- Testing of Devices (*200 points on rubric - breakdown below*)
 - o 30 pts = Device is able to sit on the wires on it's own, WITH cargo.
 - o 12 pts = Device moves past the start line under power, with cargo
 - o 1/2 pt / Inch traveled forward under power, with cargo (18 foot track)
 - o 40 pts = Released cargo over the drop zone.
 - o 2 pts / cargo item delivered to the bucket.
- Presentations will be graded by a group of industry judges.

SAFETY!!!

- Teams will be using hand & power tools
(Exacto knives, Scissors, Hot Glue Guns, Hand Saws, Chorded Drill).
 - o BE CAREFUL and TAKE YOUR TIME
 - o MUST wear safety glasses while using saw and/or drill.
- Be careful when around other contestants not to distract them or injure yourself.
- Horseplay will not be tolerated - act professionally.

Testing

- Your team will have 10 minutes to perform three tests, each 2 minutes long.
 - o When brought into test area, gather your supplies from your table and return to entry area awaiting your turn to test.
 - o When brought to test area – place your prototype on the wires.
 - Your prototype must fit on the wires without support.
 - o When ready to test – let the judges know.
 - Your 2 minute timer will start.
 - You can then load your cargo into your prototype.
 - You can then start your device.
 - Your device has the remaining time to travel to the drop zone and release it's cargo correctly.
 - o Once your 2 minutes are up, the judges will record points and you can reset the device for your 2nd attempt.
 - o This process repeats until you have three attempted runs on the wire.
 - o The judges will record your BEST run on the rubric.
- Upon completion of your test, you will be directed to a Presentation Judging Table.

Presentations: 10 minutes

- Your team will have the FIRST TWO MINUTES for;
 - o Sales Pitch of your _____ to the judges
 - o In this time period YOU will be talking to the judges about why your _____ should be the best...
 - o You may use props, posters, models, etc
 - o Your team WILL BE CUT OFF at 2 minutes
- Your team will have an additional TWO MINUTES to;
 - o Explain how your team came to the conclusion of the final product line.
 - o This is in accordance with the “Interview” section of the TEC Rubric.
 - o You may use props, posters, models, etc.
 - o Your team WILL BE CUT OFF at 2 minutes
- Your team will have a final SIX MINUTES for Q&A from the judges.
 - o Your team will be asked to answer random questions from the judges.
 - o Questions will be about your team work process.
 - o You may use props, posters, models, etc.
 - o Your team WILL BE CUT OFF at 6 minutes.

CONTEST PROCEDURES

1. Contestants will be identified by number only.
2. The Team Written Test will be taken during the pre-contest briefing.
3. The technical committee will provide each team with the problem and the contest supplies at the time of the pre-contest briefing.
4. Each team's “solution” will be constructed on site.
 - a. Construction is ONLY allowed in the contest area and during the contest times as presented in the pre-contest briefing.
5. Contest judges will interview each team as a part of the contest.
 - a. Team interview timeslots will be available during the pre-contest briefing.

SCOPE OF THE CONTEST**Knowledge Performance**

- The contest includes a written test to be taken by all members of the team at the same time.

Skill Performance

- The demonstration is a presentation of an occupational skill accompanied by a clear explanation of the topic through the use of examples, experiments, displays and practical testing operations.

Contest Guidelines

The Team Engineering Challenge contest will allow SkillsUSA members to demonstrate their ability to work together to solve a problem.

1. The challenge will be selected from an area such as, but not limited to:
 - a. Transportation
 - b. Communications
 - c. Construction
 - d. Manufacturing
 - e. Biotechnology
 - f. Engineering
2. The contestant's advisor/instructor must attend the mandatory orientation meeting with the contestant.
3. Contestants will not take the skills-related written or Professional Development Test as outlined in the general regulations.
4. Tie Breaker — Tie will be broken by reviewing the Highest score from the team rubrics. If tie is not broken from option a, then option b and c will be looked at in order.
 - a. “Solution: Performance”
 - b. “Interview: Problem Solving / Team Work”
 - c. “Written Test score”

National TEC SkillsUSA Contest Guidelines

PURPOSE

This contest is designed to evaluate and to recognize outstanding students for excellence and professionalism in the areas of creative and critical thinking skills and the decision making process, to solve a problem. The contest is intended to foster creativity, innovation, team work, and problem solving skills.

GENERAL REGULATIONS

CLOTHING REQUIREMENT

For men: Official blazer, jacket or sweater; black dress slacks; white dress shirt; plain black tie with no pattern or SkillsUSA black tie; black socks and black shoes.

For women: Official blazer or jacket; black dress skirt (knee-length) or slacks with business like white, collarless blouse or white blouse with small, plain collar that may not extend onto the lapels of the blazer; black sheer or skin-tone seamless hose and black dress shoes.

These regulations refer to clothing items that are pictured and described at: www.skillsusastore.org. If you have questions about clothing or other logo items, call 800-401-1560 or 703-956-3723.

Note: Contestants must wear their official contest clothing to the contest orientation meeting.

ELIGIBILITY

This contest is open to active SkillsUSA members enrolled in a middle school chapter (grades 6-8). A team consists of 3 students from the same local chapter.

Teams must qualify from their local state conference.

OBSERVER RULE

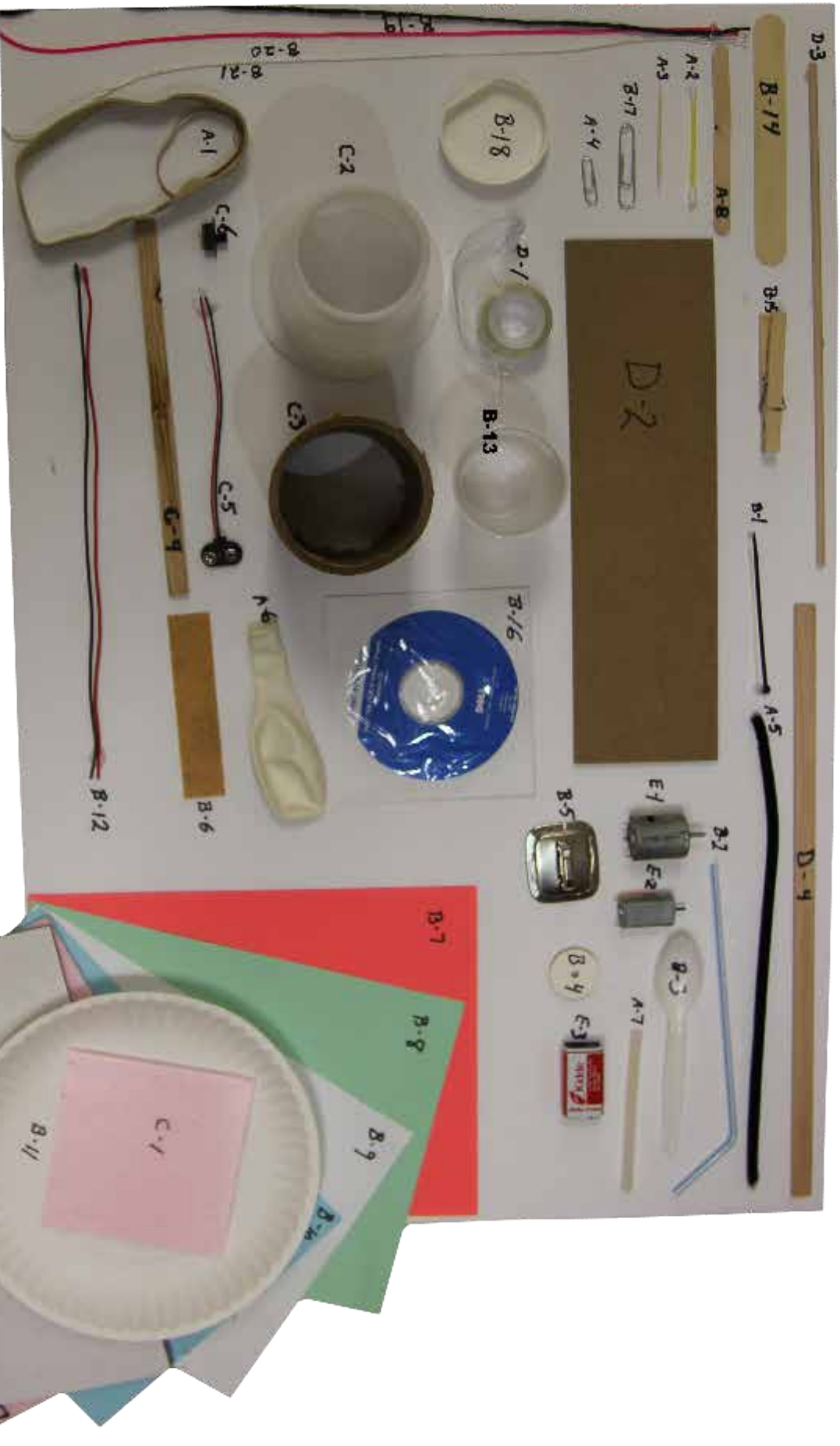
Observers will be allowed to watch the match providing space is available. No talking or gesturing will be permitted. The event chair or moderator may remove observers and/or close the event to observers for cause.

EQUIPMENT AND MATERIALS

1. Supplied by the technical committee:
 - a. All tools, materials, and supplies necessary to solve the contest problem except those items listed under number two below
 - i. Such items may include: hack saw, glue guns, cordless drill.
 - b. All necessary information and furnishings for judges and technical committee
2. Supplied by the students:
 - a. Drawing equipment (team's choice - for example: ruler, straightedge, t-square, triangle, scale, pencils, pens, compass, etc...)
 - b. Safety glasses
 - c. Calculator
 - d. Scissors
 - e. Exacto-knife or equivalent
 - f. Coloring / Writing utensils (Markers, Crayons, Colored Pencils, etc)
 - i. Paint is not allowed.
 - g. Students are not allowed materials that will "add" to their prototype.
 - i. Tape, glue, paper, staples, paper clips, etc
 - h. Other tools as listed on the contest update page of the national website

National TEC SkillsUSA Contest RUBRIC

	EVALUATED ITEMS	Points Possible	Points earned	REMARKS
Pre-Contest Briefing	WRITTEN TEST General understanding of the Problem-Solving Process, Engineering-Design Process and Technical Skills related to the Team Engineering Challenge contest guidelines.	50		This is a "Team test"
Contest Team	Pre-Planning: sketches, brainstorming, plan Materials Order Form(s)	100 50		1st Order Form -10pts 2nd Order Form -10pts 3rd Order Form -20pts
	Use of Woodlines • Did team work together? • Did team utilize leading opportunities?	100		
Interview / Testing	INTERVIEW: Presentation / Sales Pitch • Did the solution meet the client's goals? • Did the team explain their solution? • Did the team use visual aids?	150		Interview process is generally 5-7 minutes in length
	INTERVIEW: Problem Solving / Team Work • How did the team overcome a challenge? • Did everyone contribute? • Did team improve their solution through leading? • Did team explore more than one solution? • Did team discuss +/- of various solutions?	150		
	SOLUTION: Prototype / Construction • Creativity/Originality • Workmanship - thoroughness of design, care and quality of construction	150		Testing of prototypes will be done in front of judging panel. 2-3 minute time frame for test.
	SOLUTION: Performance • Application - precision, location (does it do what it's supposed to do?)	200		
	Clean-Up	50		
	SUBTOTAL	1,000		
PENALTY POINTS	Material Penalty	0 to -50		
	Carrying Penalty	0 to -50		
	Remove Penalty	0 to -10		
	Team Member Penalty	0 to -50		(Team of 3)
	TOTAL	1,000		



TEC Supply Store
Items shown correspond with the Order Forms & Display Board
Round 1: Quantities guaranteed
Rounds 2-8: First Come / First get...

4: Design, sketch and document a Rube Goldberg machine with at least 5 steps that opens your front door while you are sitting on the couch. Artistic quality not graded. An example is provided of a Rube Goldberg machine. (15 pts)

2015 SkillsUSA National Competition

Team Engineering Challenge

Middle School

Team #: _____
(1pt)

_____ 50 pts

DO NOT OPEN UNTIL TOLD TO

Written Test – (50 pts total)

This is a team test, your members may work together to answer this test and submit as one team test for one score.

This is a timed test – your team will start when the contest committee says to, and you are to stop writing when the contest committee says to.

1: below are 6 steps from one style Design Process. Put the following steps in order from 1 to 6. (12 pts)

(Write in the blanks provided, 1 for first and 6 for last)

- ___ Evaluate and select solution.
- ___ Define problem.
- ___ Test and document solution.
- ___ Brainstorm.
- ___ Design and build solution.
- ___ Repeat process until satisfied with solution.

2: Imagine your team is working on a project, following the above Design Process, to solve a problem. After selecting your solution, one of your team members storms out of the room. List 3 ways to engage this team member to help the team complete their solution. (4 pts each)



A:

B:

C:

3: Describe a personal experience you have had with one of the previous six steps. Explain the importance of that step in your particular scenario. (10 pts)

Team #					
___ 4th Order ___ 5th Order ___ 6th Order ___ 7th Order ___ 8th Order					
Items	Price	Qty	Total Price		
A-1	Rubber Bands (Size Varies)	2 for \$1			A-1
A-2	QueTips	2 for \$1			A-2
A-3	Toothpick	2 for \$1			A-3
A-4	Small Paperclip	2 for \$1			A-4
A-5	Pipe Cleaner	2 for \$1			A-5
A-6	Balloon	2 for \$1			A-6
A-7	Glue Stick	2 for \$1			A-7
A-8	Small Popsicle Stick	2 for \$1			A-8
B-1	Zip Tie	\$1			B-1
B-2	Straw	\$1			B-2
B-3	Spoon	\$1			B-3
B-4	Roller Wheels	\$1			B-4
B-5	Metal Latch	\$1			B-5
B-6	Sand Paper	\$1			B-6
B-7	Pink Cardstock Paper	\$1			B-7
B-8	Green Cardstock Paper	\$1			B-8
B-9	White Printer Paper	\$1			B-9
B-10	Blue Cardstock Paper	\$1			B-10
B-11	Paper Plate	\$1			B-11
B-12	12" of Wire (Red or Black)	\$1			B-12
B-13	Plastic Cup	\$1			B-13
B-14	Large Popsicle Stick	\$1			B-14
B-15	Clothes Pin	\$1			B-15
B-16	Compact Disc	\$1			B-16
B-17	Large Paper Clip	\$1			B-17
B-18	Plastic Lid	\$1			B-18
B-19	3 feet of Black Yarn	\$1			B-19
B-20	3 feet of Pink String	\$1			B-20
B-21	3 feet of White String	\$1			B-21
C-1	4" x 4" x 1/4" Pink Foam Square	\$2			C-1
C-2	Plastic Tube	\$2			C-2
C-3	Cardboard Tube	\$2			C-3
C-4	1/8 x 1/2 x 9 inch Pine Stick	\$2			C-4
C-5	Battery Clip	\$2			C-5
C-6	Switch	\$2			C-6
D-1	Roll of Clear Tape	\$3			D-1
D-2	3.5" x 12" x 1/4" Wood Sheet	\$3			D-2
D-3	3/16" x 12" Wood Dowel	\$3			D-3
D-4	1/8" x 1/2" x 15 inch Pine Stick	\$3			D-4
D-5	8.5" x 11" x 1/4" Pink Foam Sheet	\$3			D-5
D-6	10" x 12" Cardboard Sheet	\$3			D-6
E-1	Large Motor	\$5			E-1
E-2	Medium Motor	\$5			E-2
E-3	9 Volt Battery	\$5			E-3
		total price =			

Team #					
___ 4th Order ___ 5th Order ___ 6th Order ___ 7th Order ___ 8th Order					
Items	Price	Qty	Total Price		
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B-20	3 feet of Pink String	\$1			B-20
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E-1	Large Motor	\$5			E-1
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		total price =			

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Contest Time	Pre-Planning; sketches, brainstorming, plan	100		1st Order Form -0pts 2nd Order Form -10pts 3rd Order Form -20pts
	Materials Order Form(s)	50		
	Use of Worktime • ex: Did team work together? • ex: Did team utilize testing opportunities?	100		
INTERVIEW / TESTING	INTERVIEW: Presentation / Sales Pitch • ex: Does the solution meet the Client's goals? • ex: Does the team explain their solution? • ex: Did the team use visual aids?	150		Interview process is generally 5-7 minutes in length
	INTERVIEW: Problem Solving / Team Work • ex: How did the team overcome a challenge? • ex: Did everyone contribute? • ex: Did team improve their solution through testing? • ex: Did team explore more than one solution? • ex: Did team discuss +/- of various solutions?	150		
	SOLUTION: Prototype / Construction • ex: Creativity/Originality • ex: Workmanship - thoughtfulness of design, care and quality of construction	150		Testing of prototypes will be done in front of judging panel. 2-3 minute time frame for test.
	SOLUTION: Performance • Application - practicality, function (does it do what it's supposed to do?)	200		
	Clean-Up	50		
	SUBTOTAL	1,000		
PENALTY POINTS	Material Penalty	0 to -50		
	Clothing Penalty	0 to -50		
	Resume Penalty	0 to -10		
	Team Member Penalty	0 to -50		(Team of 3)
TOTAL – ROUND 1		1,000		