2007 Power Puzzle Challenge

Missions, Rules, Field Set Up, Project

Missions

• **Roof Solar Panel:**

Mission: Move the Roof Solar Panel ONTO the roof of the house by the sea for 15 points.

• Personal Vehicle Choice:

Mission: Move the Hydrogen Car <u>TO</u> the white property or all-black driveway of the house by the sea and move the truck either <u>TO</u> the parking lot to be recycled, or <u>TO</u> the farm to be re-purposed. The car in its target is worth 25 points only if the truck is in one of its targets. The parking lot is the white area directly west of Base. The farm is the white area isolated between both rivers.
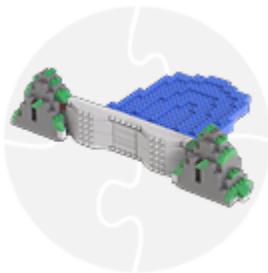
• Hydro-Dam:

Mission: Place the Dam so it is <u>TOUCHING</u> both banks of any river section east of Base for 25 points. The Dam must be upright. When the match is over, the referee places (or projects) the Flood upstream of the Dam and there is a single maximum 10 point deduction if any houses are being <u>TOUCHED</u> by the Dam or Flood. The Dam is never considered a stray object.

• Wind Turbines:

Mission: Place Wind Turbines so they are <u>TOUCHING</u> any white area not directly outside Base. The Wind Turbines must be upright. Scoring Wind Turbines are worth 15 points each.

• Grid Connection:

Mission: Place the Power Lines so they are TOUCHING the white of the Power Plant's property and the white of surrounding communities. The Power Lines must be upright. Communities connected to the Power Plant's property in this way are worth 5 points each. Each connected community that is in turn TOUCHING a scoring Hydro-Dam or scoring Wind Turbine is worth an added 5 points.
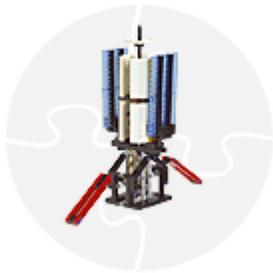
• Solar Power Satellite:

Mission: Lower one of the Satellite's panels for 15 points. If your robot is the first to do this, 5 points are added.

• Wave Turbine:

Mission: Bring your own team-designed Wave Turbine (one per team) and move it TO the ocean directly west of the sandy beach. Your Wave Turbine model must consist of at least two pieces that move independently of each other. A scoring Wave Turbine is worth 25 points. A meaningful design is worth your time, but not worth points, and won't be judged.

• Coal Mining:

Mission: Get the loaded Rail Car to roll down the Railroad tracks. Only if and when the loaded Rail Car TOUCHES the stoppers at the end, the team is allowed to retrieve it TO Base by hand for 10 points.

• Oil Drilling:

Mission: Move all the Oil Barrels (including the red version) OFF the Oil Platform for 10 points.

• Corn Harvest and Processing:

Mission: Move all the Corn (including the red version) TO Base. The corn in its target is worth 25 points only if at least one Oil Barrel has been moved TO the Farm.

• Uranium Mining:

Mission: Move all the Uranium (including the red version) OUT of the farm for 15 points.

• Tree Planting:

Mission: Move Trees TO any area north of the main river. Trees must be upright. Pieces may be connected or attached to the Trees. Planted Trees are worth 10 points each. Trees moved to the Power Plant area could score as fuel, but do not score as planted.

• Power Plant Supply:

Mission: Move fuel TO the Power Plant's property.
Trees: 10 points each (Maximum of two, because... For each Tree to score as fuel, another Tree must score as "Planted")
Black Coal: 10 points for at least half of the original load
Green Uranium: 10 points each
White Oil Barrels: 5 points each
Since energy is needed in order to find and process fuels, and since the processing and consumption of fuels often involves undesirable effects and by-products, the red versions of the fuel models represent inefficiency and negative impacts, which need to be minimized. There must be no red fuel models IN the Power Plant area for this mission to count. The separation (processing) of red fuel models from others may be done by the robot anywhere, or by hand IN Base.

• Oil Barrels:

Oil Barrels of either color are worth 10 points each IN [Base] as unused reserves, but... If you rescue the robot while there are Oil Barrels IN Base, the referee takes one away so it does not score. White will be taken before red. If there are no Oil Barrels IN Base at the time of the

rescue, there is no loss. There is a single maximum 40 point deduction if any Oil Barrel from anywhere is TOUCHING any water or property with a house.

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• Parking Lot:

The parking lot is designated as a storage area with respect to the Housekeeping rule, so the team is allowed to move objects to and from the parking lot by hand for storage only. The robot is allowed to enter and exit the parking lot, but it is not allowed to make contact with scoring objects nor strategic objects there.

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• Fairness Bonus:

Based on well documented scoring data from the 2006 FLL tournament season, a fairness bonus is applied to the non-perfect raw scores earned by teams who are still using the RCX platform so that similar amounts of effort are reflected by similar scores as follows: Every 5 raw points up to 100 are worth 8 points. Raw scores from 105 to 325 get 60 points added. Raw scores from 330 to 395 are replaced by scores of 386 to 399 respectively.

Rules

1. Read this First To maximize performance and eliminate surprises, you (the team) must take the time to read and understand FOUR documents: the Field Setup Instructions, the Missions, these Rules, and the CURRENT Questions & Answers (Q&A) page on the web.

2. Mission A mission is a job the robot can perform to achieve results that are worth points. The robot starts from Base and goes out on one or more trips to work

on one or more missions per trip. Missions may be tried in any order, alone or in groups, re-tried when possible and allowed, or skipped. Points are given if the required results are still visible on the field at the END of the match.

3. Match At a tournament, two Challenge fields are joined back to back, and each team is paired opposite another to compete in a match. For 2-1/2 minutes, the robot tries to get as many points as it can by achieving mission results. The timer never pauses during a match. There is a minimum of three matches, and each one is a fresh chance for you to get your best score. No match has anything to do with another, and only your best score counts specifically toward the Performance Award.

4. Round The process of cycling all teams through one match each is called a round. Tournaments run at least three rounds. Between your match in one round and the next, you have time to go to the pit area and work on the robot and its programs as needed, but this time may be limited, depending on the schedule of other proceedings.

5. Participation The maximum allowable team size is ten members, not including coaches and mentors. See "The Coaches' Handbook" for allowable ages. At the tournament, only two team members at a time are allowed right up at the competition table except during repair emergencies. The rest of the team may stay nearby, but away from the table. To share in participation, members may rotate in/out at any time.

6. Robot The robot is defined as the RCX or NXT brick and anything currently connected or attached to it. Mission models, strategic objects, separate pieces, and separate attachments are not part of the robot.

7. Materials This rule is not just about the robot... This rule controls everything you bring from the pit area to the competition area including the robot, all attachments, and all strategic objects when viewed all at once as a package. All these objects must be made entirely of LEGO elements in original factory condition (except LEGO string and tubing may be cut to length), and must conform to the following quantity limits on electrical parts, no matter what you intend to use or connect or attach to the robot at any one time:

For RCX users:	**For NXT users:**
RCX controller (1)	NXT controller (1)
motors (3)	motors (3)
touch sensors (2)	touch sensors (2)
light sensors (2)	light sensors (2)
lamp (1)	lamp (1)
rotation sensors (3)	rotation sensors (3 minus the number of NXT motors present)

3rd touch OR light sensor (1)   ultrasonic sensor (1)

LEGO wires and converter cables are allowed as needed. Spare/alternate electrical parts are allowed in the pit area. Objects functioning as remote controls are not allowed anywhere. There are no restrictions on the quantity or source of non-electric LEGO pieces. Wind-up/pull-back "motors" are allowed, and do not count as motors. Pneumatics are allowed. Marker may be used for owner identification in hidden areas only. Paint, tape, glue, oil, etc. are not allowed. Stickers are not allowed except LEGO stickers applied per LEGO instructions.

8. Software The robot must be programmed using LEGO software as supplied in LEGO sets only (any platform, any release).

9. Downloading One team's download can erase another team's programs and ruin their performance. Therefore, downloading is only allowed in the pit area. Download settings must be kept on short range, the process must be shielded from surrounding teams, Bluetooth must be switched off, and the robot should be kept OFF when not in use.

10. Base Base is an imaginary hollow shape formed by vertical walls that rise from the perimeter of the Base's footprint (including the inside surface of the border walls), and by an invisible ceiling 16 in (40 cm) high. NOTE: Base is a VOLUME—not an area. Base is the place for the robot to be prepared, started from, and serviced, and sometimes Base is a target for scoring objects. However, the robot does not have to go back to Base for missions to count, and it does not have to be in Base when the match ends.

BASE:
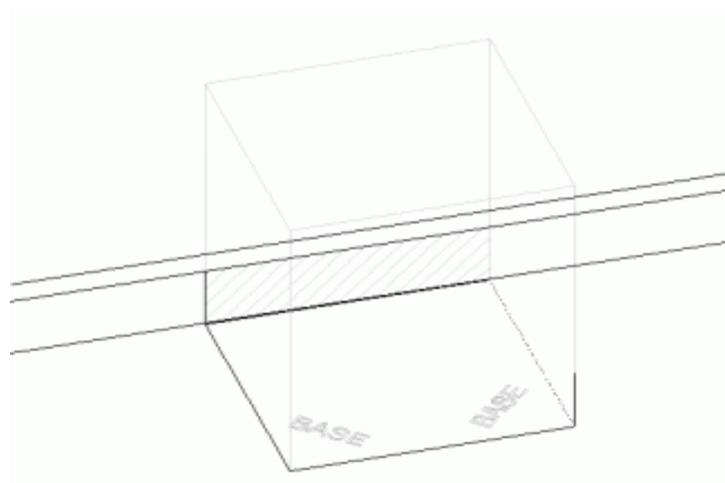
11. Housekeeping Any objects in Base which could get in the way of the robot's preparation or motion may be kept "near" Base as long as they do not cause any

changes in the field, and their placement is not strategic in any way.

12. Operational Definitions Though the Challenge is fun, it is robotics after all, and like all technical work it depends on specifics and exact descriptions of physical conditions. To avoid disagreement between you and the refs over the meanings of common words, we provide these operational definitions for the locations/positions of objects (including the robot) with respect to the missions, rules, and Q&A. Be sure to refer back here when you see these words or their opposites:

<u>IN</u>/<u>INTO</u>/<u>TO</u> (for areas as targets) Any bit of the object just needs to barely cross over the outer edge of the target.

<u>IN</u>/<u>INTO</u> (for containers as targets) The object must be trapped from being dislodged in at least five directions.

<u>OUT</u> (for areas and containers) Not one bit of the object is in. Note: Out always means completely out.

<u>ON</u>/<u>ONTO</u> (for objects as targets) The target must be able to support all the weight of the object when any/all other supports are removed, as proven or estimated by the ref.

<u>OFF</u> (for areas and objects) None of the object's weight is being supported in any direction.

<u>TOUCHING</u> (for any target) The object itself must be making direct contact with the target, only when the word "touching" is used. <u>COMPLETELY</u> Every bit of the object must meet the condition.

13. Strategic Objects Strategic objects are team-supplied objects other than the robot and its attachments, handled by you during preparation mode, or used by the robot in autonomy mode.

14. Scoring Objects Scoring objects are objects that could be worth points depending on their location. To score, each scoring object must itself meet the mission requirements for points, no matter where the robot or any strategic objects is. You are not allowed to bundle, connect, or attach scoring objects to each other, but placing them in a strategic container is allowed.

15. Stray Objects Any object caused by a robot to be in the way of either team's robot performance may be moved by the ref upon team request if it can be done without a direct effect on scoring. Objects in scoring position may be shifted to equivalent scoring positions if possible, and worthless objects may be removed from the table.

16. Loss of Contact If the robot is in autonomy mode and loses contact with any object, that object stays where it is and is considered stray, except as described in the ROBOT DAMAGE rule. For loss of contact in transition mode, the team maintains control of the object.

17. Preparation Mode Before the match starts, and before every restart, the robot

is considered to be in preparation mode. During this time, the robot must be in Base and you may handle it (by hand) as needed, for such things as repairs, changing attachments, loading or unloading objects, setting mechanisms, pressing buttons, signaling sensors, and aiming. Strategic aiming devices may be used, but the robot is not allowed to make contact with them during starts. Objects apart from the robot may be handled in Base or off the table at any time.

18. Starting Position For all starts, every bit of the robot and any objects in contact with it must be completely in Base, with leniency for "slight" overextensions. The word "slight" is not defined here, so you should stay focused on the word "completely."

19. Starting Procedure To be allowed to start, the robot must be motionless in starting position, and you must not be touching it in any way. You are then allowed to use one of three ways to put the robot into motion: touch a button, signal a sensor, or wait for a running/paused program to resume. You must not handle the robot in any other way throughout the start. Freshly started, the robot is then considered to be in transition mode.

20. Transition Mode A freshly started robot is in transition mode until it's out of Base. In transition mode, the robot is not allowed to do anything but leave Base, taking along any objects it was already in contact with. It is not allowed to lose or gain contact with anything at all until it is in autonomy mode (out of Base). Touching the robot in transition mode forces it into preparation mode, and you maintain control of any objects involved.

21. Autonomy Mode [Once] the robot is out of Base, it is considered to be in autonomy mode, free to perform allowable action until the match ends, or until the instant you next touch the robot (or influence it in any way). Touching the robot in autonomy mode (called a "rescue" no matter what the real reason is) forces it into preparation mode. Any objects involved will be left in their rescue spot, and THE REF COULD TAKE OTHER OBJECTS AWAY BASED ON DETAILS IN THE MISSIONS.

22. Muscle Action You are not allowed to cause anything but the robot to leave or extend out of Base except as described in the STARTING PROCEDURE rule.

23. Allowable Action In addition to actions specifically allowed, any action not specifically prohibited in the Missions, Rules, or Q&A is allowed except those described in the REVERSIBLE ACTION rule. So before you ask any question that begins "Can we...," remember that if nothing written anywhere says you can't, then you CAN. There are no hidden restrictions. In the same way, before you ask any question that begins "Do we have to...," remember that if nothing written anywhere says you have to, then you don't have to. There are no hidden requirements.

24. Required Methods Usually no specific method is required for achieving

mission results, and you are free/encouraged to be creative, but when a specific method is required for achieving a mission result, you are not allowed to achieve that result any other way.

25. Reversible Action If something happens that's not allowed, the ref reverses (undoes) it so it has no impact on scoring and reminds you it's not allowed. Note: The robot is allowed to make mistakes, mess up the field, etc., so these actions are not necessarily reversed.

26. Robot Damage At any time during a match, you may recover robot parts that come off as result of obviously unintentional damage. You may do this by hand or request help from the ref.

27. Field Damage You are not allowed to take models apart nor add pieces to them. You are not allowed to handle mission models out of Base. You must use the mission models supplied by the tournament and are not allowed to bring duplicates to the competition area. The robot is not allowed to break mission models nor defeat Dual Lock. If a mission model breaks, malfunctions, moves, or is activated by anything other than allowable action, the ref reverses the change as soon as possible (if possible). Field damage, too severe to reverse, is left as is and could fall under the STRAY OBJECTS rule. If points are earned along with field damage that occurs due to faulty model design, construction, or setup as judged by the ref, you keep those points. Field damage that obviously occurs due to the team or robot, whether intentional or not, draws a warning and repeats could make associated missions worthless.

28. Interference Your robot is not allowed to have any effect on the other team's robot, field, or strategy except by directly meeting the scoring requirements of missions in areas that are shared between the two sides by design of the Challenge.

29. Score Determination To minimize controversy about what happened during a Match, THE SCORE IS DETERMINED AT THE END OF THE MATCH, BY THE CONDITION OF THE FIELD AT THAT TIME ONLY. This means that points are not given for accomplishments that the robot accidentally trashes before the match ends.

30. Benefit of the Doubt In situations that are too close to call, like when a split-second or the thickness of a line is a factor, or when a situation could "go either way" due to confusing, conflicting, or missing information, you get the benefit of the doubt. If you disagree with the ref and can respectfully raise sufficient doubt in the ref's mind, the ref meets with the head ref, and the resultant decision is final. This rule is not an order for the refs to ignore requirements, but it is a license for them to make calls in your favor whenever it's reasonable to do so.

31. After the Match At the end of each match, the ref needs time to concentrate and record the condition of the field, so no one is allowed to touch anything. You

(kids only, please) and the ref look at the field together and come to agreement about what points were scored or missed and why, and to be sure you're not walking away with any mission models. Finally, the ref gives the okay for field reset.

32. Variability Every effort is made by our suppliers, donors, and volunteers to ensure that all fields are correct and identical, but some variability is to be expected, such as texture/bumps under the mat, waviness in the mat itself, flaws in the border walls, and variety in lighting conditions and rigging. Although the robot is allowed to extend over the tops of the border walls in autonomy mode, interference may vary at the ends of the field.

33. Precedence When there is conflict between a mission and a rule, the mission takes precedence, but the current Q&A page on the web (MAKE SURE TO CHECK BACK THERE OFTEN) takes overall precedence. Note: The head ref is not obligated to consider calls made at previous tournaments unless the Q&A has been updated.

34. Challenge Questions/Support For official answers to questions about the Robot Game part of the Challenge, including rulings on special strategies or situations, e-mail flltech@usfirst.org (most efficient) or call 1-800-871-8326, x118 (less efficient). For best results, be sure you've read the four documents listed above, under the READ THIS FIRST rule.
When e-mailing, be sure to put "Challenge" in the subject line, and please state your role on the team (member, coach, parent, mentor). When calling, please first leave your contact information slowly, your role on the team, and YOUR QUESTION on voicemail. NOTE: flltech does not answer questions about building or programming the robot (that's your Challenge).
NOTE: The FLL International Forum is great for sharing ideas and getting tips from each other, but it is NOT AN OFFICIAL SOURCE OF ANSWERS about anything. NOTE: flltech can not support LEGO product.
For NON-game-related technical support for LEGO product (RIS, RoboLab, NXT), call 1-866-349-5346.

35. Full Disclosure/Transparency Since individual victory need not come at the expense of collective excellence, all official answers given through Challenge support are subject to public posting in the Q&A, including answers about ALLOWABLE strategies. Also, the only documents given to the refs for reference to conduct matches and make calls are the same four documents you and every other team have access to all season. So if a strategy is questionable for you, chances are it will be questionable for the ref too, and guarding it until the tournament is risky. No new Q&A entries will be posted after 3PM (eastern U.S.) on Fridays.

36. Coaches' Meeting If a question does come up right before the tournament, your last chance to ask it is at the "Coaches' Meeting" the morning of the

tournament. There, the head ref and the coaches meet to identify and settle any differences BEFORE any matches start. For the rest of the day, the ref's calls are final when you leave the table.

Field Setup

Overview:

The Challenge field can loosely be compared to an obstacle course on a mat. The "obstacles" are called mission models, and the mat is called the field mat. Some of the models are secured to the mat using 3M Dual Lock fastening material. The mat must be on a smooth, hard, flat surface, and it must be surrounded by border walls to contain all the action.

Requirements:

This step first requires that you...

- have read and followed the instructions under "Surface & Borders" so you now have an official framework on which to stage your field.
- have read and followed the instructions on the CD that came with your Field Setup Kit so you now have the LEGO mission models built.
- have the field mat and the Dual Lock fastening material that came in your Field Setup Kit.

Field Mat Placement:

Step 1: Vacuum the surface on which you'll be staging the mat. Even the tiniest particle under the mat can give the robot trouble. After vacuuming, run your hand over the surface and sand or file down any protruding imperfections you find. Then vacuum again.

Step 2: See the sketch labeled Table/Mat Orientation. Never unroll the mat in an area where it could pick up particles. On the vacuumed surface unroll the mat and position it so the image is up and BASE (the area with logos) is at the south center of your surface (the south edge should be one you have easiest access to).

Step 3: Slide and align the mat so there is no gap between the southeast corner's edges of the mat and the corresponding southeast border walls. Gaps are expected and acceptable at the north and west edges.

Step 4: With help from another person, pull the mat at opposite ends, then massage out any waviness from west to east and re-check the requirement of Step 3. It is expected that some waviness will persist, but that should relax over time. Some

teams use a hair dryer to speed the relaxation of the waviness.

Table/Mat Orientation
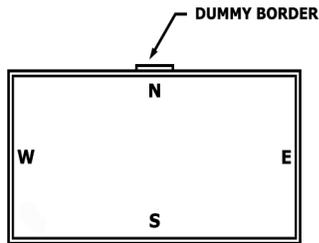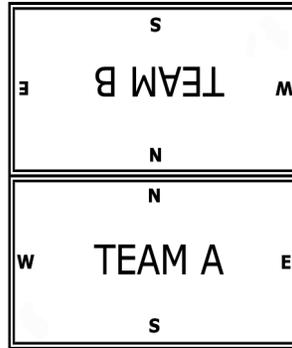
PRACTICE SETUP   TOURNAMENT SETUP

Using Dual Lock: The Mission Models can be taken off the field mat for transport and storage. Some are loose, but others are secured with a re-usable fastening material from 3M called Dual Lock, which comes with the LEGO bricks in your Mission Model Set. Dual Lock is designed to stick or "lock" to itself when two faces of it are pressed together, but you can unlock it too.

When a model's placement requires Dual Lock, the model's location mark on the mat will contain boxes with X in them. For each X box, apply a piece of Dual Lock, adhesive side down, to the mat. Square pieces will need to be cut in half for the rectangular boxes. Next, press (lock) a like-sized piece of Dual Lock, adhesive side up, onto to the ones you just finished sticking to the mat.

Tip: Since the second piece of each Dual Lock pair would rather stick to you than lock to its partner, press the second piece onto the first using the wax paper the Dual Lock was supplied on instead of your bare finger, then peel away the paper.

Finally, for each Dual Locked model, line the model up exactly over its location, being sure that all labeled features are facing as labeled. Carefully lower the model and press it down onto the Dual Lock. Try to press down on the lowest solid structure of each model instead of crushing the whole model. This application process for the Dual Lock is only needed once—later, the models can simply be locked onto the mat or unlocked.

Model Details:

Oil Platform: Place Dual Lock and point the Oil Platform as shown on the mat, so that its Oil Barrels would release from west to east. Setup is with the south yellow arm up, and the north yellow arm's long end pointing north. Place three Oil Barrels (two white ones, and a red version between them) lying down on the black release

ramp. The studs on each barrel may point north or south (variable). Resistance against the up/down movement of the south yellow arm is normal and variable.

House: Place Dual Lock and point the House as shown on the mat. Place the girl near the east end of her black walkway, and keep the door opened 90 degrees.

Truck: (No Dual Lock) Place and point the Truck as shown on the mat, with its wheels on the short lines and between the long lines. Place three of the red version of the Oil Barrel lying down on the floor in the bed of the truck, with two behind the cab and one between the wheel wells. The studs on each barrel may point toward front or rear (variable). Barrels must not be connected to each other.

Solar Powered Satellite: See the sketch labeled Table/Mat Orientation. At a tournament, a single Solar Power Satellite model is shared by Team A and Team B at the absolute center of a tournament setup. In other words, the model is centered east/west, then centered half on Team A's north border, and half on Team B's north border. If your practice table doesn't have another table next to it, you need to nail some scrap border wood to the outside of your north border wall to form the Dummy Border seen in the sketch. Setup is with both blue solar arrays and the white-dished pointer all pointing up.

Power Plant: Place Dual Lock and point the Power Plant as shown on the mat.

Uranium: (No Dual Lock) Place the two Uranium models and one red version of this model as shown on the mat, with their loops vertical upright and in line with the small black orientation lines.

Corn: (No Dual Lock) Place the two Corn models and one red version of this model as shown on the mat, with their loops vertical upright and in line with the small black orientation lines.

Railroad and Rail Car: Place Dual Lock and point the Railroad track as shown on the mat. Perfect closure of the Dual Lock is not possible for this model, but a good connection at the west edges of each pair is sufficient. Fill the Rail Car with twenty pieces of black coal and eight pieces of the red version of the coal.

Roof Solar Panel, Hydrogen Car, Power Lines, Dam and Flood, Five White Oil Barrels, Four Trees, and Two Wind Turbines: (No Dual Lock) Setup is with these models in BASE and/or completely in the white area of the parking lot.

Field Maintenance:

Border Walls: Remove any obvious splinters, and cover any obvious holes.

Field Mat: Make sure the mat rests evenly at the bottom of the south and east border walls. Avoid cleaning the mat with anything that will leave a residue. Any

residue, sticky or slippery, will affect the robot's performance compared to a new mat. (Many tournaments use new mats). Use a vacuum and/or a damp cloth for dust and debris, above and below the mat. When moving the mat for transport and storage, be sure not to let the material bend into a sharp kink point, which could affect the robot's movement. Many consistent repetitions of rubbing on the same areas of your practice mat should be expected to cause wear in the image, but such wear is unlikely at a tournament. Tournaments using new mats should unroll the mats as far in advance of the tournament day as possible. For control of extreme curl at the east or west edges of the mat, tape is allowed, with a maximum of ¼" (6 mm) overlap. Do not use tape under the mat.

Mission Models: Keep the models in original condition by straightening and tightening solid connections often. Ensure that spinning axles spin freely by checking for end-to-end play and replacing any that are bent.

Project

This year's Power Puzzle challenge is about understanding the elements of energy use in a world that uses more and more energy every day. As our world grows and changes, so do our energy needs. The Power Puzzle missions get FLL teams to consider some of the energy choices we have available and how those choices affect the world. With the Power Puzzle project, your team has the opportunity to look at many types of energy choices, analyze the possibilities, and work to improve energy use.

Whether it is environmental, financial, social, or cultural, each energy choice can have positive impacts in some areas while having negative consequences in others. The challenge is to find practical solutions in your community without ignoring the larger impacts your action or inaction can have on your life or around the world. As you work to find the balance between all these issues, realize that the solution for your home, community, country, or world will be unique.

As we work to make the puzzle pieces fit, we must consider all parts of energy use, including how energy is made, how it is stored, how we use it, how much we consume, and how we dispose of associated waste.

How will the pieces of your puzzle fit together? What is your energy solution?

The Project

1. **Select** a building in your community and **evaluate** the energy use.

   With your team, discuss the different energy sources used in your community and what the current energy issues are in the area where you live. Then choose a building in your community, like a school or municipal building. Contact the manager of that building, discuss the project, and ask for his/her help in performing an energy audit. In this audit, your team should look at the types of energy used throughout the building, how it is used, and the amount used. Contact experts in the field and examine the process by which different types of energy are made and the important effects of producing and using them, such as costs, availability, and environmental issues.

   Consult the "Project Resources" page on the website for instructions and sample materials of what is needed to perform an energy audit.

2. **Talk** to experts and **propose** solutions to reduce consumption or move toward alternative energy use.

   Once you know the energy needs of your chosen building, look at the areas of improvement to find solutions. How efficient is the energy use? How could you make it better? What about their sources of energy?

   Research potential alternate energy solutions and propose short-term and long-term changes that can be made to move toward renewable energy or reduced consumption. Can you find an innovative way to reduce energy use or change to a more sustainable energy source? Is there a new technology that could be developed to better support specific needs? Maybe there are scientists or engineers that you could contact who are already working on such a solution. Consider all areas of the building and community this change might impact and how realistic your solution is. You should show exactly how your solution would create a positive change.

3. **Share** the changes for your building with the community.

   Once you have researched and developed your solution, get out there and share it with your community! Event judges will expect you to explain how you showed the community your short- and long-term solutions and the information you have to back up your ideas. Use this project as an opportunity to see just how big an impact you and your team can have on your community and your world.

Note: Explain how you completed all THREE parts of the Project, its purpose, and solutions. Share your presentation in order to qualify for project awards at qualifying and championship tournaments.

Refer to the "The Project, " chapter 5, of the "*FIRST* LEGO League Coaches'

Handbook" for help and ideas. Practice your presentation so it takes no more than five minutes, including setup time.