FIRST LEGO LEAGUE

SENIOR SOLUTIONS℠ CHALLENGE

Senior Solutions
Independent. Engaged. Connected.

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FIRST

LEGO education

Innovation Project

Through the SENIOR SOLUTIONS℠ Innovation Project, your team will:

- **Find** a senior partner
- **Identify** and learn about a problem faced by seniors
- **Create** an innovative solution to the problem you identify
- **Share** your problem and solution with others

THINK ABOUT IT

From the second you were born to this very minute, you are getting older. At first, this means growing bigger, learning to walk and talk, and discovering your connection to the people and the world around you. You grow from baby to toddler to child to teenager to adult to senior. Your Innovation Project challenge this season is to investigate the stage of growth known as being a senior.

Have you ever thought about what it's like to be 60 years old or older? "Boring!" you say? Consider these seniors:

- "Banana" George Blair entered his first barefoot waterskiing competition when he was 64. Since then, he set many world records—like being the first person to waterski barefoot on all seven continents. He was still waterskiing at age 93.
- At age 100 years, inventor Eemeli Väyrynen became the oldest person ever to receive a patent in Finland for his improved potato planter.
- People call Eileen Philippa "Phil" Raschker the greatest female athlete in the world over the age of 60. Some say she might be the greatest female athlete of all time.
- Annie Elizabeth "Bessie" Delany (age 101) and her sister Sarah Louise "Sadie" Delany (age 103) published a book about their first 100 years and were on the New York Times bestseller lists for 105 weeks.

But, just as there are challenges as young people grow from a baby to an adult, growing as a senior can have its drawbacks. Some people have trouble remembering things. As the nervous system grows older, it takes longer to notice changes and react. As muscles grow older, they can become less flexible. Some people move more slowly.

Body parts begin to wear out. Diseases like osteoporosis (bone loss), arthritis (swollen joints), glaucoma (pressure inside the eye that may cause blindness), and others often attack seniors. As friends and family members become less active, or even die, many seniors find themselves in smaller social groups. As seniors themselves experience aging, many require more care—physically, mentally, emotionally, and socially.

Each person ages in a different way. Some people experience only one or two problems. Others seem to experience none at all. Lots of seniors still work, exercise, go dancing, travel, and have a great time. Just like anyone, seniors need the right solutions for their specific challenges.

FIND A SENIOR PARTNER

Your Innovation Project challenge this season is to solve a problem faced by seniors as they age. To start, your team needs to find a senior partner. Many people define seniors in different ways. For the SENIOR SOLUTIONS Innovation Project, look for an adult who is 60 years of age or older.

Not sure how to find a senior partner? Consider these suggestions:

Each Team Member — Begin by looking at your own family and friends. Consider grandparents, great grandparents, neighbors, assisted living residents, business owners, or babysitters. Make a list of the seniors you know. How do you know each one?

- Do you volunteer with seniors?
- Is there a senior center in your community?
- Are there activities, classes, or social events for seniors in your neighborhood?

As a Team — Next, take a look at each team member's list. Talk about how your team can connect with these people. Do they live near you? Can you talk with them in person? Over the phone? Using email or social media? By letter? Can you learn about what life was like when they were children? Teenagers? Young adults?

As a Team — Choose a senior and invite that senior to be your partner and help with your Innovation Project. Remember, not everyone who is asked will be able to help your team. If a senior says, "I'm sorry. I can't help," invite someone else. Your team may also choose to research a famous senior.

IDENTIFY A PROBLEM

As a Team — Get to know your team's senior partner. Find out about his or her life, history, and the challenges seniors face today. You might want to ask your senior partner questions like: When were you born? How was life different then? Where did you go to school? What did you study? What do you (or did you) do for a living? What did you like to do when you were 10 years old, 25, 40, last year? Are any of those things more difficult now? Why? What would make your life easier today?

Keep in mind that everyone wants to be treated with respect—and seniors are no exception. Find out what your senior partner loves about being older, as well as what things might be a little harder now. Your senior partner might tell you about challenges faced by a senior friend or relative. Here are a few examples of tasks some seniors say they find challenging:

- Recovering from injuries
- Keeping up with new technology
- Remembering certain things (the date, when to take a particular medicine, or to turn off the stove after cooking)
- Staying fit
- Finding fun things to do, by themselves and with others
- Managing their finances
- Getting what they need – food, household goods, medicine, clothing
- Communicating with family, friends, doctors, and other helpers

As a Team — Choose one problem that your senior partner identified and learn about it. (If your team chose to research a famous senior, choose one of the problems that senior experienced after age 60.) What causes the problem? What is being done to solve the problem today? Are new solutions being developed by scientists or engineers? Some resources you may use to look for information are: reports, books, magazines, and websites. Check with professionals who work in and around your community. Use any research tools you have available. Be prepared to share your information sources.

While you are researching your senior's challenges, find out about a professional who is working to solve their problem. Is a scientist, physician, or engineer helping with research or developing new technology? Is a social worker, community activist, or health care worker developing new programs? Can your team connect with a professional to learn more?

CREATE AN INNOVATIVE SOLUTION

Now that your team has decided on a problem, your challenge is to create an innovative solution—one that makes life better by improving something that already exists, using something that exists in a new way, or inventing something totally new. Learning about current solutions is just the beginning. How can your solution help seniors feel respected and do the things they love? How will your solution help seniors stay independent, engaged, and connected?

Think about it. Work together! Brainstorm! Share all your ideas. One team member's "crazy idea" just might inspire the perfect innovative solution. What could be done in a new way? What could be done better? What will it take to make your team's solution happen? A great solution might take all the imagination and ingenuity your team can muster. It might seem so obvious that you wonder why the problem even exists.

And remember, the most important thing is to have fun.

SHARE WITH OTHERS

Now, tell others about the problem you researched and exactly how your solution can help. You choose how to share what you've learned. Give a talk. Create a website. Perform a skit. Make a comic book. Rap. Create a poster. Pass out flyers. Write a poem, song, or story.

Think about who is helped by your solution. How can you let them know? Can you present your research and solution to other seniors, lawmakers, doctors, engineers, or groups who already help with your problem? Who would your senior partner like to tell about your solution? What's the best way to teach your audience about the problem and solution? Your sharing can be simple or elaborate, serious or designed to make people laugh while they learn.

PRESENT YOUR SOLUTION AT AN EVENT

If your team chooses to attend an event, prepare a presentation to share your problem and solution with the judges. Your presentation can include posters, slide shows, models, multimedia clips, your research materials – be creative. Remember, you want to leave a lasting impression.

TO BE ELIGIBLE FOR INNOVATION PROJECT AWARDS, YOUR TEAM MUST:

1. Identify your team's senior partner. (Your senior partner is not required to attend.)
2. Identify the problem your team chose to research.
3. Describe your team's innovative solution.
4. Describe how your team shared your findings with others.
5. Meet the presentation requirements:
   - Give your presentation live; you may use media equipment (if available) but only to enhance the live presentation.
   - Set up and complete your presentation in 5 minutes or less with no adult help.
   - Include all team members in some way during the Innovation Project judging session.

Judges expect to your team to:

- Clearly explain both the problem and your team's solution
- Use different types of research resources, including professionals in the field
- Consider existing theories and solutions as you develop your own solution
- Be innovative
- Show that you thought about what it will take to make your solution happen in the real world
- Target your sharing toward those who might benefit from your team's work
- Find a way to present your work that is both effective and creative

Robot Game: Field Setup

The field is where the Robot Game takes place.

- It consists of a field mat, on a table, with mission models arranged on top.
- The field mat and the LEGO® pieces for building the mission models are part of your Challenge Set.
- The instructions for building the mission models are here.
- The instructions for how to build the table here.

NOTE: BEGINNING IN 2019-20, THE FIELD MAT SIZE IS DIFFERENT AND WILL HAVE DIFFERENT RULES SURROUNDING ITS PLACEMENT ON THE TABLE.

MISSION MODEL CONSTRUCTION

Build the mission models - Use the LEGO elements from your Challenge Set. It will take a single person three to four hours to do this, so it's best done in a work party. For any team members with little or no experience building with LEGO elements, mission model construction is a great way to learn. This step is also a nice time for new team members to get acquainted with each other.

MISSION MODEL ARRANGEMENT AND SETUP

Dual Lock™ – Some models are secured to the mat, others are not. Where a model needs to be secured, the connection is made using the re-usable fastening material from 3M called Dual Lock, which comes in the flat clear bag with the LEGO elements in your Challenge 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, for ease of transport and storage. The application process for the Dual Lock is only needed once. Later, the models can simply be locked onto the mat or unlocked. To apply Dual Lock:

Step 1 - Stick one square, adhesive side down, on each box you see on the mat with an "X" in it (Exception: Senior Solutions design changes after mat production allow for less Dual Lock than originally shown. Omit as described below.)

Step 2 - Press a second square on top of each of those, "Locking" them on, adhesive side up. TIP: Instead of using your finger, use a bit of the wax paper the squares came on.

Step 3 - Lower the model onto the squares.

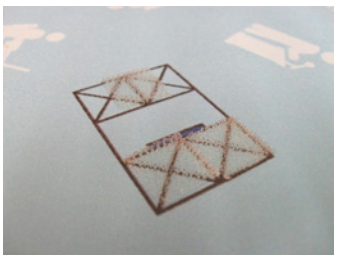
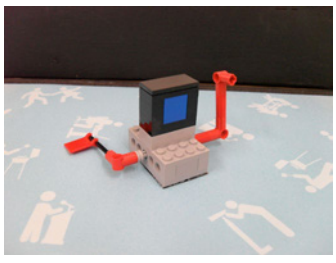
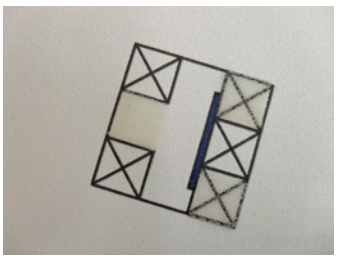
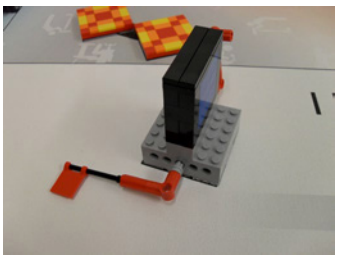
CAUTION - Be sure to place each square precisely on its box, and each model precisely over its marks.

CAUTION - When pressing a model down, press down on its lowest solid structure instead of crushing the whole model. Pull on that same structure if later you need to separate the model from the mat.

TIP: For large and/or flexible models, apply only one or two sets at a time.

(**NOTE**: The rings in the pictures below are not part of setup and don't come in your kit – they're just in the pictures to help show areas of no Dual Lock.)

VIDEO SCREENS – For each screen, Dual Lock in 3 places as shown in the pictures.
Set position is with the flag laid back and out as shown.

QUILTS – Dual Lock in 5 places for the blue pair and 6 places for the other pair, as shown on the mat.

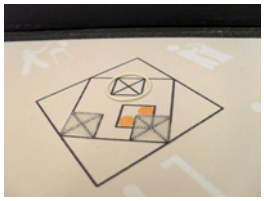
GARDEN – Dual Lock in 2 places as shown in the picture. Omit the pair indicated by the ring. Orient with the brown crate over its mark on the mat. Number, shape and placement of the flowers on their base is non-critical and allowed/ expected to vary. The crate's contents are also non-critical.

STOVE – Dual Lock in 4 places as shown on the mat. Set position is with the two red burners showing.

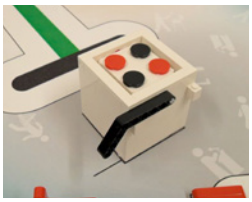
COOPERATION – Dual Lock in 4 places as shown on the mat. Set position is with the pointer leaning east.

QUILTS

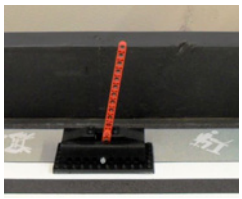
GARDEN



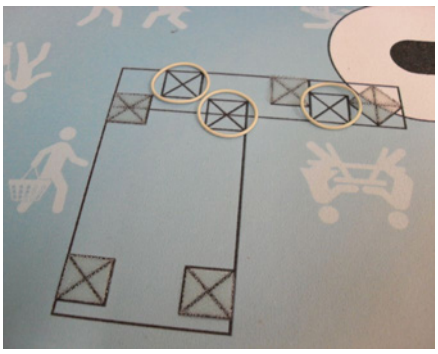
STOVE



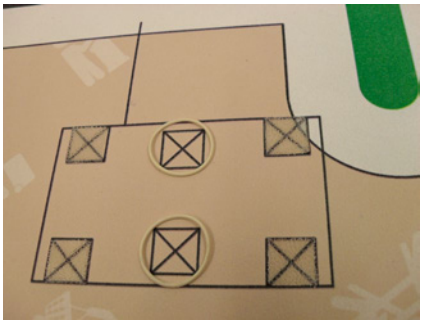
COOPERATION

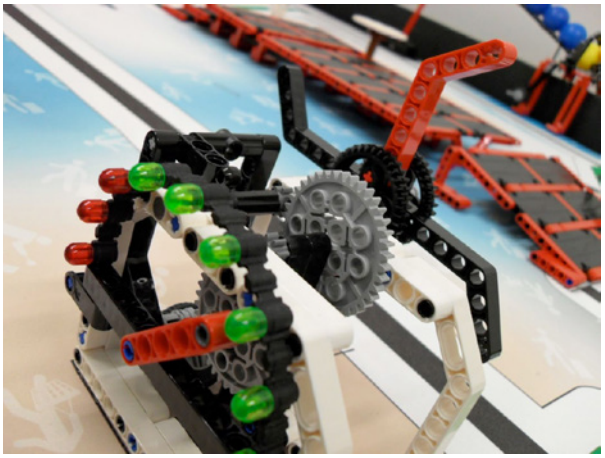


DOG – Dual Lock in 5 places as shown in the picture. Omit the pairs indicated by the white rings. Set position is with the gray disc pulled all the way east, and with the skateboard accurately placed between its location lines, in contact with the south ram. Activate and reset by pushing/pulling on the gray disc only. Don't try to push the south ram north.

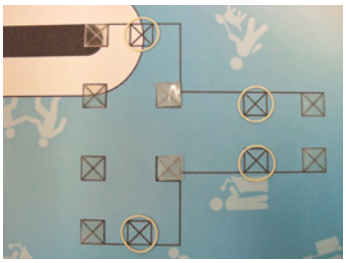


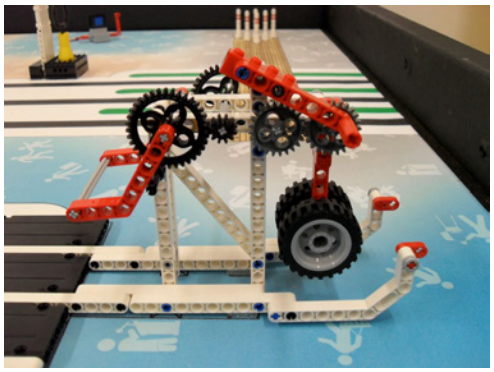
CARDIO MACHINE – Dual Lock in 4 places as shown in the picture. Omit the pairs indicated by the rings. Set position is with a RED pinwheel arm UP AND the pointer exactly aligned with the 3rd green light.



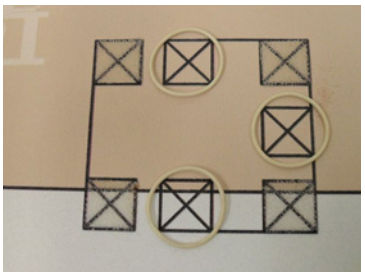


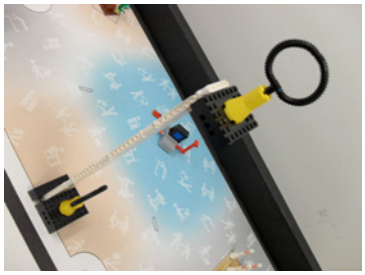
WEIGHT MACHINE – Dual Lock in 8 places as shown in the picture. Omit the pairs indicated by the rings. Set position is with the wheel hanging directly down, and with the ratchet/catch lever resting on the east side as shown.





SHELVES – Dual Lock in 4 places as shown in the picture. Omit the pairs indicated by the rings. Setup position is with one loop accurately centered on each shelf. The lower loop is parallel with the white panels, the upper one is 90° from the panels. Loops must be vertical and not distorted.

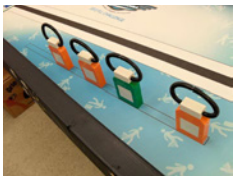




CHAIR AND TABLE – Dual Lock in 4 places as shown on the mat. Setup position is with the chair aligned accurately with its mark and “broken” as shown. The south side of the small part swings west. Both black connecting pins are in the small part, but only the north pin is in the large part.

BOWLING PINS – Place on their marks accurately. Check for straightness (press lengthwise) with every reset.

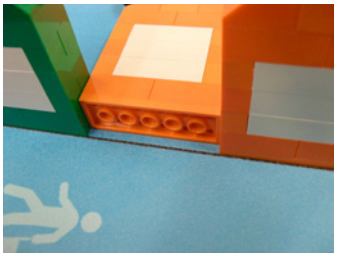
MEDICINE BOTTLES – Place bottles accurately within their marks, but in random order of color, and at random locations along the length of the marks, except that they must be spaced at least one unit of their own width from each other. The white labels face south. Loops must be vertical and not distorted.



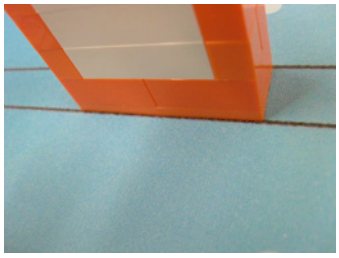
RANDOM

RANDOM

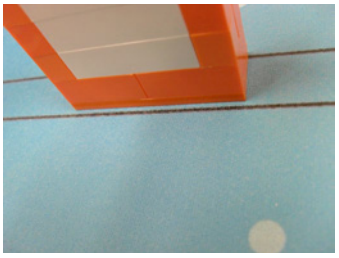
MINIMUM SPACING



ACCURATE ALIGNMENT



BAD



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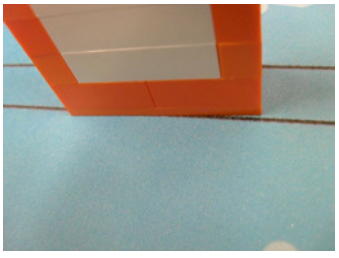
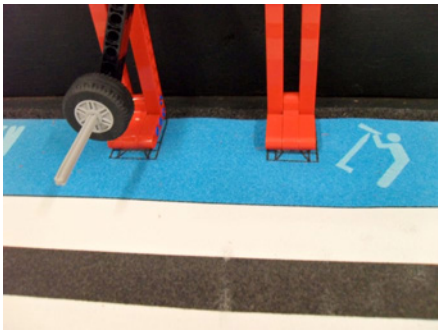
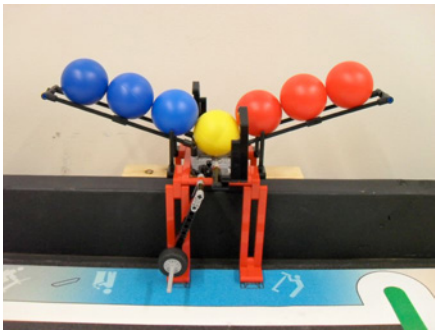
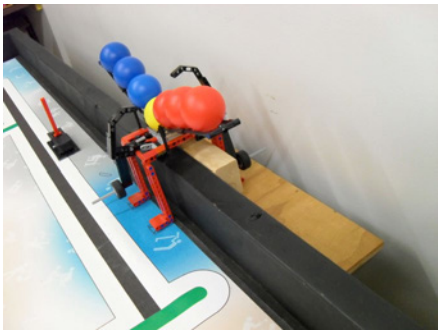


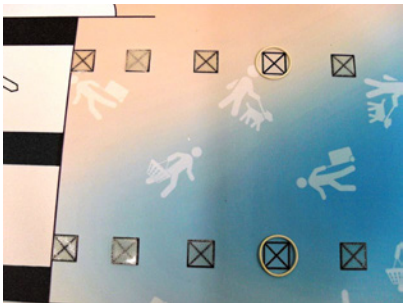
BALL RACKS – At an event, this model is centered exactly and shared by two back-to-back fields. If you have only one field for practice (which is normal, and all you need), this model extends half off the north center of your field, so you need to place one or more boards as needed to support that side evenly. Dual Lock in 2 places as shown on the mat, and 2 more places as needed on the other side. Place balls as shown. The center ball must be yellow, and the other balls must be segregated by color – but it doesn't matter which side has which color.

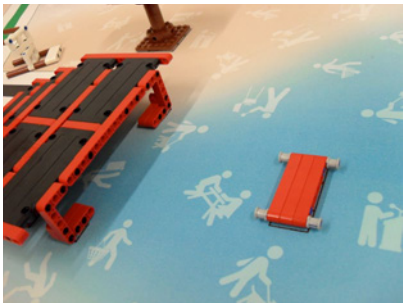


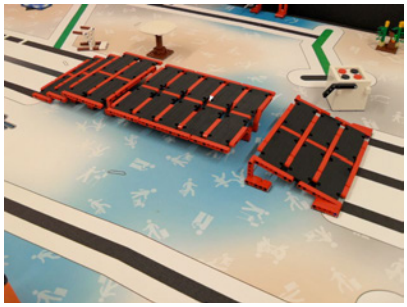




TRANSITIONS – For the stairs, Dual Lock in 8 places as shown in the picture. Omit the pairs indicated by the rings. For the platform's anchor, and the ramp, Dual Lock in 2 places and 8 places respectively, as shown on the mat. Center the tipping platform so it's trapped over its anchor. The platform should align with the stairs and ramp, and tip north or south, but not slide anywhere.



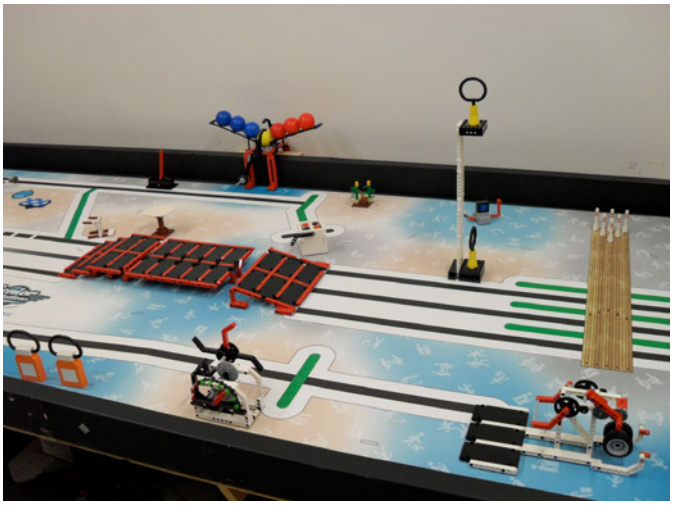




BASE – Place the remaining 4 quilt squares, plants, and yellow ball in Base. It doesn't matter how they're placed there, since you're allowed to move things around in Base and other storage areas any time.

REFERENCE LEFT SIDE VIEW

REFERENCE RIGHT SIDE VIEW



FIELD MAINTENANCE

- **Border Walls** - Remove any obvious splinters, and cover any obvious holes.
- **Field Mat** - Make sure the mat touches the south border wall, and is centered east to west. 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 damp cloth for dust and debris (above and below the mat). To get marks off, try a white-plastic pencil eraser. When moving the mat for transport and storage, be sure not to let it bend into a sharp kink point, which could affect the robot's movement. Tournaments using new mats should unroll the mats as far in advance of the tournament day as possible. For added control at the east or west edges of the mat, tape is allowed, with a maximum of ¼" (6 mm) overlap. Foam tape is not allowed.
- **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.

Robot Game: Rules

GUIDING PRINCIPLES

GP1 - *GRACIOUS PROFESSIONALISM*® You are "Gracious Professionals." You compete hard against **problems**, while treating **all people** with respect and kindness.

GP2 - INTERPRETATION

- **If a detail isn't mentioned, then it doesn't matter.**
- Robot Game text means exactly and only what it plainly says.
- If a word isn't given a game definition, use its common conversational meaning.

GP3 - BENEFIT OF THE DOUBT If the referee feels something is a "very tough call," and no one can point to strong text in any particular direction, you get the **Benefit Of The Doubt**. This good-faith courtesy is not to be used as a strategy.

GP4 - VARIABILITY Our suppliers and volunteers try hard to make all Fields correct and identical, but you should always expect little defects and differences. Top teams design with these in mind. Examples include Border Wall splinters, lighting changes, and Field Mat wrinkles.

GP5 - INFORMATION SUPERIORITY If two official facts disagree, or confuse you when read together, here's the order of their authority (with #1 being the strongest):

#1 = **MISSIONS** and **FIELD SETUP**
#2 = **RULES**
#3 = **REFEREE** In unclear situations, local referees may make good-faith decisions after discussion, with Rule GP3 in mind.

DEFINITIONS

D01 - MATCH A "Match" is when two teams play opposite each other on two Fields placed north to north.

- Your Robot **LAUNCHES** one or more times from Base and tries as many Missions as possible.
- Matches last 2-1/2 minutes, and the timer never pauses.

D02 - MISSION A "Mission" is an opportunity for the Robot to earn points. Requirements are written in the form of

- **RESULTS** that must be visible to the referee at the **END OF THE MATCH**.
- **METHODS** that must be observed by the referee **AS THEY HAPPEN**.

D03 - EQUIPMENT "Equipment" is everything **YOU BRING** to a Match for Mission-related activity.

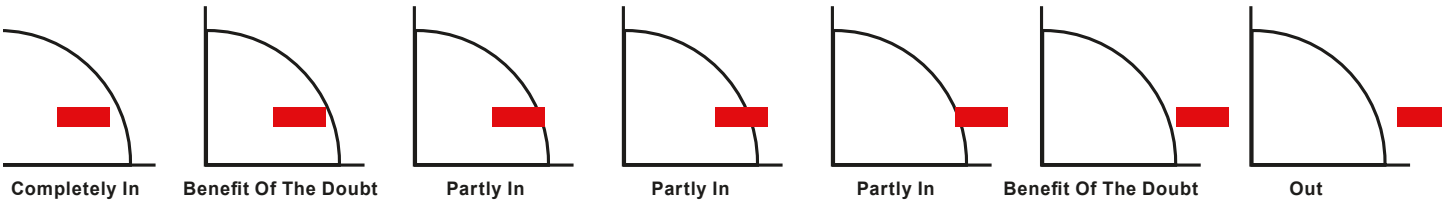
D04 - ROBOT Your "Robot" is your **LEGO® MINDSTORMS®** or **SPIKE Prime** controller and all the Equipment you've combined with it by hand which is not intended to separate from it, except by hand.

D05 - MISSION MODEL A "Mission Model" is any LEGO® element or structure **ALREADY AT THE FIELD** when you get there.

D06 - FIELD The "Field" is the Robot's game environment, consisting of Mission Models on a Mat, surrounded by Border Walls, all on a Table. "Base" is part of the Field. For full details, see FIELD SETUP.

D07 - BASE "Base" is the space directly above the Field's quarter-circle region, in the southwest. It extends southwest from the outside of the thin curved line TO the corner walls (no farther). The thin line around any scoring area counts as part of that area. When a precise location related to a line is unclear, the outcome most favorable for the team is assumed. (See diagram below.)

D07 - BASE



D08 - LAUNCH Whenever you're done handling the Robot and then you make it GO, that's a "Launch."

D09 - INTERRUPTION The next time you interact with the Robot after Launching it, that's an "Interruption."

D10 - TRANSPORTED When a thing **(anything)** is purposefully/strategically being

- taken from its place, and/or
- moved to a new place, and/or
- being released in a new place,

it is being "Transported." The process of being Transported ends when the thing being transported is no longer in contact with whatever was transporting it.

EQUIPMENT, SOFTWARE, AND PEOPLE

R01 - ALL EQUIPMENT All Equipment must be made of LEGO-made building parts in original factory condition.

Except: *LEGO string and tubing may be cut shorter.*

Except: *Program reminders on paper are OK (off the Field).*

Except: *Marker may be used in hidden areas for identification.*

R02 - CONTROLLERS You are allowed only ONE individual controller in any particular Match.

- It must be from a LEGO Education Robot Set (RCX, NXT, EV3 or SPIKE Prime).
- ALL other controllers must be left in the **PIT AREA** for that Match.
- All remote control or data exchange with Robots (including Bluetooth) in the competition area is illegal.
- This rule limits you to only **ONE** individual **ROBOT** in any particular Match.

R03 - MOTORS You are allowed up to **FOUR** individual motors in any particular Match.

- Each one must come from a LEGO Education Robot Set.
- You may include more than one of a type, but again, your grand total may not be greater than **FOUR**.
- ALL other motors must be left in the **PIT AREA** for that Match, **NO EXCEPTIONS**.

R04 - EXTERNAL SENSORS Use as many external sensors from a LEGO Education Robot Set as you like.

- You may include more than one of each type.

R05 - OTHER ELECTRIC/ELECTRONIC THINGS No other electric/electronic things are allowed in the competition area for Mission-related activity.

Except: *LEGO wires and converter cables are allowed as needed.*

Except: *Allowable power sources are ONE controller's power pack or SIX AA batteries.*

R06 - NON-ELECTRIC ELEMENTS Use as many non-electric LEGO-made elements as you like, from any set.

Except: *Factory-made wind-up/pull-back "motors" are not allowed.*

Except: *Additional/duplicate Mission Models are not allowed.*

R07 - SOFTWARE Use any software that allows the Robot to move autonomously – meaning it moves on its own. No form of remote control is allowed.

R08 - TECHNICIANS

- Only two team members, called "Technicians," are allowed at the competition Field at once.

  Except: *Others may step in for true emergency repairs during the Match, then step away.*

- The rest of the team must stand back as directed by tournament officials, with the expectation of fresh Technicians being able to switch places with current Technicians at any time if desired.

PLAY

R09 - BEFORE THE MATCH TIMER STARTS After getting to the Field on time, you have at least one minute to prepare. During this special time only, you may also

- ask the referee to be sure a Mission Model or setup is correct, and/or
- calibrate light/color sensors anywhere you like.

R10 - HANDLING DURING THE MATCH

- You are not allowed to interact with any part of the Field that's not **COMPLETELY** in Base.

  Except: *You may Interrupt the Robot any time.*

  Except: *You may pick up Equipment that* **BROKE** *off the Robot* **UNINTENTIONALLY***, anywhere, any time.*
- You are not allowed to cause anything to move or extend over the Base line, even partly.

  Except: *Of course, you may* **LAUNCH** *the Robot.*

  Except: *You may move/handle/***STORE** *things off the Field, any time.*

  Except: *If something accidentally crosses the Base line, just calmly take it back – no problem.*
- Anything the Robot affects (good or bad!) or puts completely outside Base **stays as is** unless the Robot changes it. Nothing is ever repositioned so you can "try again."

R11 - MISSION MODEL HANDLING

- You are not allowed to take Mission Models apart, even temporarily.
- If you combine a Mission Model with something (including the Robot), the combination must be loose enough that if asked to do so, you could pick the Mission Model up and nothing else would come with it.

R12 - STORAGE

- Anything completely in Base may be moved/stored off the Field, but must stay in view of the referee.
- Everything in off-Field Storage "counts" as being completely in Base and may be placed on an approved holder.

R13 - LAUNCHING A proper Launch (or re-Launch) goes like this:

- **READY SITUATION**
  - Your Robot and everything in Base it's about to move or use is arranged by hand as you like, all fitting "**COMPLETELY IN BASE**" and measuring no taller than 12 inches" (30.5 cm).
  - The referee can see that nothing on the Field is moving or being handled.
- **GO!**
  - Reach down and touch a button or signal a sensor to activate a program.

IF FIRST LAUNCH OF THE MATCH – *In this case, accurate fair timing is needed, so the exact time to Launch is the beginning of the last word/sound in the countdown, such as* "**Ready, set, GO!**" *or* **BEEEEP!**

R14 - INTERRUPTING If you **INTERRUPT** the Robot, you must stop it immediately, *then calmly pick it up for a re-Launch. Here's what happens to the Robot and anything it was Transporting, depending on where each was at the time:

- **ROBOT**
  - Completely in Base: . . . . . Re-Launch
  - NOT completely in Base: . . . . . Re-Launch + Penalty
- **TRANSPORTED** THING WHICH **CAME FROM BASE** DURING THE MOST RECENT LAUNCH
  - Always: . . . . . Keep it
- **TRANSPORTED** THING WHICH **DID NOT COME FROM BASE** DURING THE MOST RECENT LAUNCH
  - Completely in Base: . . . . . Keep it
  - NOT completely in Base: . . . . . Give it to the referee

The "PENALTY" *is described with the Missions.*

IF YOU DON'T INTEND TO RE-LAUNCH – *In this case, you may shut the Robot down and leave it in place.*

R15 - STRANDING If the **UNINTERRUPTED** Robot loses something it was Transporting, that thing must be allowed to come to rest. Once it does, here's what happens to that thing, depending on its rest location:

- **TRANSPORTED THING**
  - Completely in Base: . . . . . Keep it
  - Partly in Base: . . . . . Give it to the referee
  - Completely outside Base: . . . . . Leave as is

R16 - INTERFERENCE

- You are not allowed to negatively affect the other team except as described in a Mission.
- Missions the other team tries but fails because of illegal action by you or your Robot will count for them.

R17 - FIELD DAMAGE

- If the Robot separates Dual Lock or breaks a Mission Model, Missions obviously made possible or easier by this damage or the action that caused it do not score.

R18 - END OF THE MATCH As the Match ends, everything must be preserved exactly as-is.

- If your Robot is moving, stop it ASAP and leave it in place. (Changes after the end don't count.)
- After that, hands off everything until after the referee has given the OK to reset the table.

R19 - SCORING

- **SCORESHEET** The referee discusses what happened and inspects the Field with you, Mission by Mission.
  - If you agree with everything, you sign the sheet, and the scoresheet is final.
  - If you don't agree with something, the head referee makes the final decision.
- **IMPACT** Only your **BEST** score from regular Match play counts toward awards. Playoffs, if held, are just for extra fun.
- **TIES** Ties are broken using 2nd, then 3rd best scores. If still not settled, tournament officials decide what to do.

Robot Game: Missions

In the SENIOR SOLUTIONS robot game, you and your robot will manage a mix of challenges and activities related to being independent, engaged, or connected. None of them really has to do with being "old," but a few of them have a harder version and an easier version. As you notice how much harder the hard versions are, and design your robot to master them, imagine what innovative technical designs and improvements you could make in real life that would make life easier for seniors – for your loved ones, and for your future self!

MISSIONS

WOOD WORKING

Robot gets the chair to Base. You fix the chair by hand. Robot brings the chair to the table.

PRECISE SCORING CONDITIONS:

- **Chair is fixed and in Base: 15**
- **— OR —**
- **Chair is fixed and any part of it is in the space under the table: 25**

Example - NO SCORE

Example - SCORE

MEDICINE

The bottles are arranged randomly before the start of each match (See Field Setup). Robot gets the green medicine bottle to Base without disturbing orange ones.

PRECISE SCORING CONDITIONS:

- **Green bottle in Base and no orange bottles obviously moved or angled out of setup position: 25**

SERVICE ANIMALS

Robot applies force to gray disc, causing dog with phone to move toward Base.

PRECISE SCORING CONDITIONS:

- **Dog is in Base: 20**

METHOD RESTRICTION:

- **The dog's initial movement to Base must be caused by a push or impact to the gray disc.**

BOWLING

Robot sends balls to knock pins down. If the pins are not all down after the first try using a yellow ball, the referee returns that ball to Base for a second try (this can only happen once per match).

PRECISE SCORING CONDITIONS:

- **1 to 5 pins down: 7 EACH**
- **— OR —**
- **6 pins down: 60**

METHOD RESTRICTION:

- **Each pin's fall must be caused by impact from a completely loose and independent ball (not touching or guided by anything at the time of impact) or another loose/independent pin. Pins falling for any other reason are worth 0.**

STRENGTH EXERCISE

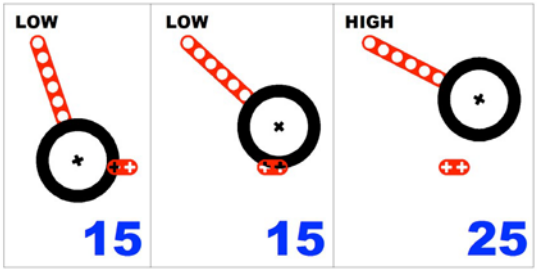
Robot lifts the west bar to make the weight rise.

PRECISE SCORING CONDITIONS:

- **Weight height equal to or between the ones labeled LOW: 15**
- **— OR —**
- **Heights equal to or higher than the one labeled HIGH: 25**

METHOD RESTRICTION:

- **The weight must rise due to the west bar being lifted.**



STOVE
Robot gets all burners to show black.

PRECISE SCORING CONDITIONS:
— All 4 burners black: 25

GARDENING
Robot adds to the garden.

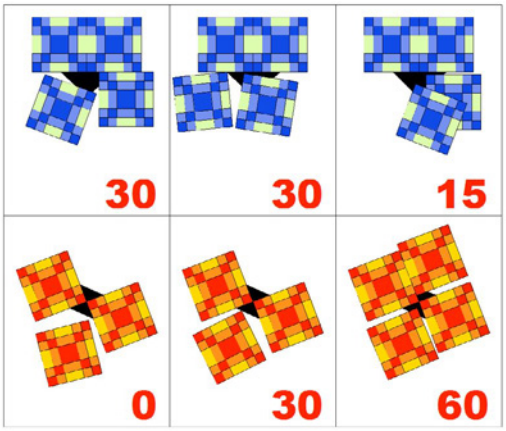
PRECISE SCORING CONDITIONS:
— Plant's base touching a white target area: 25

VIDEO CALL
Robot gets the flags to rise.

PRECISE SCORING CONDITIONS:
— Flags all the way up: 20 EACH

QUILTING
Robot adds squares to quilts.

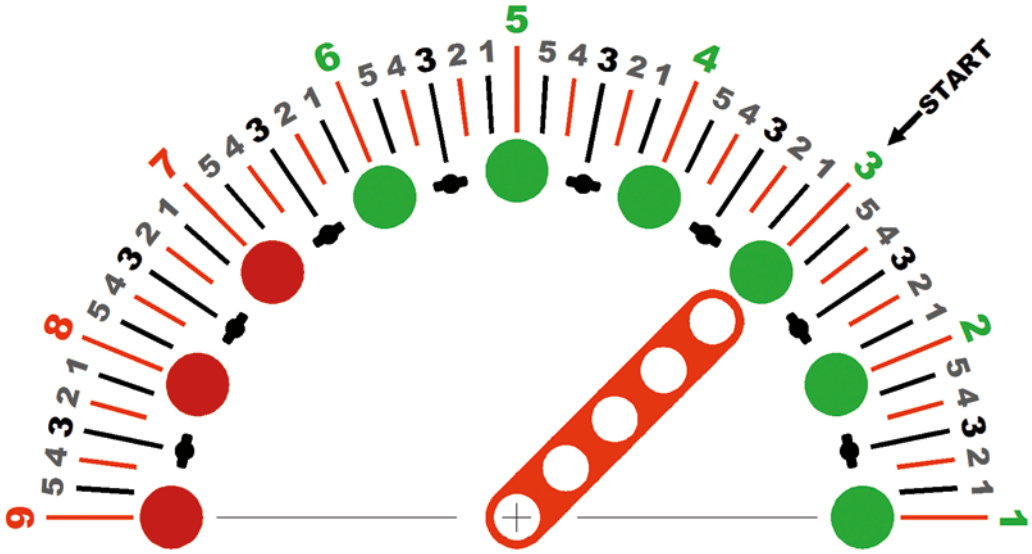
PRECISE SCORING CONDITIONS:
— Blue quilt squares touching their black target regions: 15 EACH
— ALSO —
— Orange quilt squares touching their black target area: 30 EACH



CARDIOVASCULAR EXERCISE
Robot turns the pinwheel 90° at a time.

PRECISE SCORING CONDITIONS:
— Points are shown in red on the chart.

METHOD RESTRICTION:
— Between every click of the wheel and the next, the robot must get completely into Base at least once.



POINTER POSITION	POINTS
9-0	118
8-5	117
8-4	116
8-3	115
8-2	114
8-1	113
8-0	112
7-5	111
7-4	110
7-3	109
7-2	108
7-1	107
7-0	106
6-5	103
6-4	100
6-3	97
6-2	94
6-1	91
6-0	78
5-5	75
5-4	72
5-3	69
5-2	66
5-1	63
5-0	60
4-5	55
4-4	50
4-3	45
4-2	40
4-1	35
4-0	30
3-5	25
3-4	20
3-3	15
3-2	10
3-1	5
3-0	0
2-5	-5
2-4	-10
2-3	-15
2-2	-20
2-1	-25
2-0	-30
1-5	-35
1-4	-40
1-3	-45
1-2	-50
1-1	-55
1-0	-60

FLEXIBILITY
Robot gets yellow loops to Base.

PRECISE SCORING CONDITIONS
Yellow loops in Base: 20 EACH

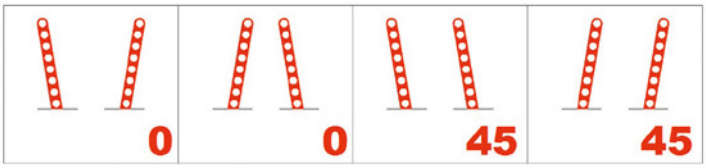
TRANSITIONS
Robot gets onto the center platform and is there when the match ends.

PRECISE SCORING CONDITIONS:
— Robot touching tilted center platform only: 45
— OR —
— Robot touching balanced center platform only: 65

For either case:
The center platform must not be touching anything but the mat and the robot.
The center platform must remain between the stairs and the ramp.

SIMILARITY RECOGNITION AND COOPERATION
Robot aligns your pointer with the other team's pointer.

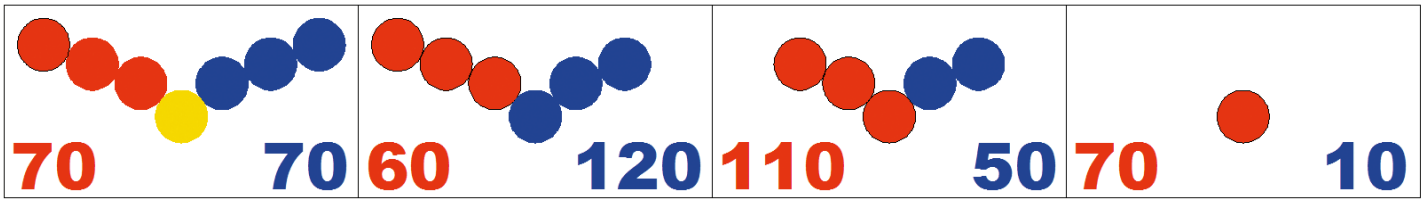
PRECISE SCORING CONDITIONS:
— Pointer on your field is parallel with pointer on other field (direction doesn't matter): 45



BALL GAME "FUTURE EFFECTS OF OUR CURRENT DECISIONS"
Both teams get points for the total number of balls on the racks at the end of the match, but only one team gets points when their color is at the center.

SCORING CONDITIONS
Balls on the racks (all balls, center + sides, any color, added together): 10 EACH FOR BOTH TEAMS
— ALSO —
Your color ball in the center position: 60 FOR YOUR TEAM ONLY

METHOD RESTRICTION:
— A push of the lever is the only allowable way for your robot to cause a ball of the other team's color to fall.
— Only one ball of the other team's color is allowed to fall for any push of the lever by your robot.



FACT: Referees note the current number of balls left at all times.
FACT: If the ball game model becomes jammed, broken, or drops any ball other than the center position, this will be known as a "glitch."

If a glitch is caused by either of these reasons:
- your robot pushes the lever on your side eastward, but too fast, too far, or not far enough…

  — OR —
- your robot interacts with the model in any other way than pushing the lever eastward the appropriate speed and distance…
  - — Both teams get credit for whatever balls were left on the rack before this happened.
  - — The other team (only) gets credit for center position (60).

If the referee determines that a glitch has occurred due to the model's design, setup, or maintenance, both parts of the ball game mission are frozen and score as follows:
- Both teams get credit for whatever balls were left on the rack before this happened.
- Both teams get credit for center position (60).

TOUCH PENALTY – If you touch the robot while it's outside Base, the referee clicks the cardiovascular exercise dial one click toward zero.

FIRST® LEGO® League is the result of an exciting alliance between *FIRST*® and the LEGO® Group.