

# FREQUENTLY ASKED QUESTIONS

Latest update: March 9, 2017

**Q1. If all the parts of the machine in contact with the floor are in the departure zone, can the machine itself extend beyond the departure zone before it is started up?**

Yes.

**Q2.1 Is the container the same for everyone or does each team have to bring its own container along?**

For the competition, the container will be provided by the organisers (see 3.1.6). The container is a box that would normally hold 5,000 sheets of letter-sized paper measuring 8.5 x 11 inches (21.6 x 27.9 cm), without its lid. **This box is provided** for the challenge and measures 22 cm in height x 45 cm in length x 29 cm in width ( $\pm 1$  cm). For the beginning of the attempt the team may place the box wherever it wishes inside a circle with a radius of 60 cm formed by the position markers.

**Q 2.2 In addition, are there permitted minimum and maximum dimensions for the container?**

Yes, as specified in 3.1.6.

**Q 2.3 Since each team brings its container, must the container be intact or can it have, for example, a hole in the side, a cut, etc. (in short, any modification that changes the initial physical surface of the container.)?**

The container will be provided by the organisers and cannot be modified.

**Q3. Are other types of batteries, other than lithium batteries, accepted (for instance, nickel cadmium)?**

Yes.

This being said, lithium batteries are not permitted in the machine itself. However, lithium tools to assemble the machine are tolerated.

**Q4. The scoring equation has a maximum. This should never happen because it makes perfection possible. The equation has no parameters that can be optimised. What will you do if two teams obtain the maximum score?**

In the event of a tie, the time that has elapsed between the beginning of the official attempt and the moment when the last ball is moved will be used to determine the winning team. The advantage will go to the team with the shorter time. (See 2.4.)

**Q5. Can an autonomous robot be used if it runs on alkaline batteries (Rule 4.1.)?**

Yes.

**Q6. Can the box be part of the machine (Rule 4.2)?**

No, the container (box) is part of the playing area.

**Q7. Can the box be placed in the departure zone (Rule 4.2)?**

Yes, the container can be placed in the departure zone as long as it's within a circle inside a circle with a radius of 60 cm formed by the position markers (see 3.1.6.).

**Q8. If the machine is made of several separate parts, can one part of the machine be placed in the box before start-up (Rule 4.4)?**

Yes, part of the machine can be inside the volume of the container, but it must not be in contact with the container.

**Q9. Can the machine extend beyond the playing zone while the balls are being recovered (playing area)?**

Yes, but there is no guarantee that there will not be any obstacles outside the surface of the playing area.

**Q10. Am I allowed to use materials from building kits like K'NEX to build my machine?**

Yes.

**Q11. Are we allowed to use a robot?**

Yes. It is important to point out that the machine must be autonomous and cannot be remote-controlled.

**Q12. If we pick up a ball with its PVC support, will we score; similarly, what if we put them in the box?**

Yes, only the balls that are picked up and held in the machine or placed in the container will count for scoring purposes. The supports can be anywhere at the end of the attempt.

**Q13. Initially, the machine can only touch the floor in the departure zone (Rule 4.4). Can any part of the machine be located outside the departure zone without touching the floor?**

The machine may be composed of several separate parts. However, before start-up, when the team declares itself to be ready, these parts must all, without exception, rest on the surface in the departure zone, (see Rule 4.2). At this specific point in time, these parts may extend beyond the rectangle of the departure zone – but only upwards – and must absolutely rest on the surface of the departure zone. After the machine has been started up, the parts of the machine no longer have to comply with this restriction.

**Q14. Before starting up the machine for an official attempt, can it rest on the floor in the departure zone and have components that extend beyond the departure zone (Rule 4.4.)?**

Yes, see the answer to Q13.

**Q15. If any of the supports located in the playing area end up in the container by accident, will we be penalised?**

No.

**Q16. Is the playing area provided or can we build our own playing area while complying with the restrictions? Can we bring it with us for the competition?**

The playing area at your college is usually supplied by the local competition organisers. During the national finals, practice playing areas will be available and the competition will take place on a playing area prepared by competition officials.

**Q17. According to the instructions, we are not allowed to use lithium batteries as a source of energy. Does this instruction apply to all types of batteries or only to lithium batteries for safety reasons?**

Only lithium batteries are prohibited. Other types of batteries are allowed.

**Q18.1. Can we put a weight of some kind on the recovery bin? A cardboard box, hit by our machine, would perhaps not be able to trigger our ball-holding mechanism.**

No.

**18.2. Can we use a remote-controlled car, operated with one hand only, to control the accelerator?**

No, the machine must be autonomous.

**Q19. Can we use an electrical object plugged into a wall outlet by means of extension cords as part of our assembly?**

No, the machine must be autonomous.

**Q20. Can there be anything else other than the balls in the box at the end of an attempt? For instance, ball supports or a part of our machine?**

Yes.

**Q21. Are we allowed to attach part of the vehicle to the floor in the departure zone? This anchor spot would remain the same throughout the challenge.**

Yes, if you comply with Rule 4.8.

**Q22. If the source of energy is not a lithium battery, can we use a robotic base like "Lego Mindstorm" or a similar device?**

Yes.

**Q24. Are we allowed to recruit sponsors for our robot's design? The rules say we are not allowed to give our robot a company name but would we be allowed to add company "stickers"?**

Yes, you can recruit sponsors. However, you may not add any stickers promoting your sponsors to your machine. You may, however, mention your sponsors during your oral presentation about your machine.

**Q25. Can the container be positioned on the machine if the container is located in the departure zone within the 60-cm radius?**

The machine cannot be in contact with the container at the beginning of the official attempt (see Rule 4.4). However, after it has been started up, and while it is autonomous, the machine can touch the container (see Rule 4.6).

**Q26. Given that the box the balls are to be put into is in the middle of the playing area, it can be moved. In contrast, working with the idea of a central pivot, can we place the pivot in the box to hold the box in place?**

Yes, a "central pivot" can be used (and will be considered part of the machine), but it must not touch the container between the time a team representative announces that the team is ready and the time the start-up action is performed (see Rule 4.4).

**Q27. After start-up, is the machine allowed to move the box by connecting to it in some way? For instance, a part of the machine sticks to the box.**

Yes, after the start-up action has been performed (see Rule 4.6).

**Q28. Are we allowed to put part of our machine in the container if the latter is in the departure zone?**

Yes, part of the machine can be inside the container's volume but it must not be in contact with the container before the start-up action has been performed (see rules 4.4 and 4.6).

**Q29. Are the supports attached to the floor or are they simply put in place?**

The supports are placed on the floor.

**Q30. Can the machine be in the container before the beginning of the official attempt?**

Yes, if it doesn't touch the container before the attempt begins (see Rule 4.4).

**Q31. Rule 4.7: What is meant by *upwards*? Does this mean the standard plane of the opening must be perpendicular to the floor at all times? Or does the standard plane of the opening simply have to be at an angle of between 1° and 179°?**

The opening of the container will be considered facing upwards if, to borrow the terms used in your question, the standard plane of the container's opening is located at an angle within a range of between 45° and 135° (0° and 180 ° being located along a horizontal axis).

**Q32. Can the container leave the central circle during the attempt?**

Yes.

**Q33. What colour will the surface of the playing area be?**

Black, with ¼ inch-wide self-adhesive white tape.

**Q34. What material will be used for the surface of the playing area? (Wood, concrete, ceramic, PVC, etc.)**

The surface is made of narrow hardwood boards, painted black. Photos have been posted on the website at <http://scienceontourne.com/le-defi-2017/>

**Q35. Are the ball supports attached to the floor?**

No, they are placed on the floor.

**Q36. Hi, I'm in elementary school but may I participate? What kind of invention do we have to make?**

Unfortunately, no. The competition is only for college students (professional category) and college staff (amateur category).

**Q37. Is it possible to specify or define the maximum boundary of play, in case a ball falls outside the surface?**

The machine can recover a ball that leaves the playing area, but there is no guarantee that the space outside the playing area will be free of obstacles.

**Q38.1. Can our team have two members instead of three?**

Yes.

**Q38.2. Are we required to give an oral presentation?**

Yes.

**Q39.1. What happens if our vehicle goes outside the boundaries of the playing area?**

Nothing in particular happens; the machine is allowed to leave the playing area. If there are any balls inside the machine at the end of an attempt, these balls will count to calculate the score. The team can, however, decide to end an attempt if it feels that its machine cannot score any more points.

**Q39.2. Do we count the balls that are in the vehicle even if the vehicle is no longer in the playing area or will only the balls in the playing area be counted?**

When the official attempt has ended, the balls in the machine and in the box will count for scoring, even if the machine or the box are no longer in the playing area.

**Q40.1. Can the start-up action be repeated if it fails the first time?**

Yes, as decided by the referee; if for instance, your triggering system were to fail (no mechanism was activated), the referee will invite you to perform your start-up action again.

**Q40.2. If so, can it be repeated as often as necessary (or when the 60-second time lapse has ended)?**

Yes, but ideally, since Rule 4.5 tells us that you are entitled to *A single action, using one hand only* to start up your machine, this single action should be enough to activate your machine. This action can be repeated if and only if you have experienced a technical problem and the referee has given you permission to start over.

**Q40.3. Can the team representative make any adjustments between start-up attempts?**

No. Once the team has declared itself to be ready, the only possible action is the start-up action (see rules 4.4, 4.5 and Section 5.7). If an adjustment needs to be made, this could end the attempt underway.

**Q40.4. While trying to start the machine, the team's attempt is automatically ended if the team representative touches the machine with both hands? Please provide more details about the start-up method.**

After the team has told the referee that it is ready, handling of the machine is limited to the start-up action (see 4.4). This action is described in Rule 4.5. Any other handling of the machine can therefore result in the attempt being ended.

**Q41.1. Can the balls be on the machine and in the container at the same time... and thus, earn 6 points per ball?**

Yes.

**Q41.2. Must the box be in the playing area?**

Before the start-up action, the box must be inside the circle with the 60-cm radius formed by the position markers. After the start-up action has been performed, there are no restrictions as to the position of the box.

**Q41.3. Can we let the balls roll endlessly or do we have to pick them up after they've gone farther than 30 cm from the playing area?**

The balls leaving the playing area that cannot (reasonably) be picked up by the machine will be collected by designated "ball gatherers".

**Q42. Concerning the machine we have to build, can we use electrical materials such as a motor or batteries?**

Yes.

**Q43. If I've understood correctly, higher plastic ball supports will now be accepted for the local and national finals. Could you please tell me the height of the new supports?**

Yes, two sizes of polyethylene barb fittings, the type commonly used in plumbing, will be accepted. Their dimensions are as follows:

- $\frac{3}{4}$  inch (1.9 cm) in diameter x  $2\frac{7}{8}$  inches (7.3 cm) high

OR

- $\frac{3}{4}$  inch (1.9 cm) in diameter x  $3\frac{5}{8}$  inches (9.3 cm) high

**Q44. Rule 5.11 says that the attempt can be interrupted by the participant and the score is counted. Consequently, my machine doesn't have to stop by itself once it has picked up all the balls. And we're allowed to intervene to stop the machine.**

Yes.

**Q45. Can I push my machine with my hand to start it?**

No. This would be against Rule 5.1. A muscular effort in humans is a form of combustion.

**Q46. We didn't manage to find ball supports with the exact dimensions (polyethylene barb fittings, the type commonly used in plumbing, with a  $\frac{3}{4}$ -inch (1.9 cm) diameter and measuring  $2\frac{7}{8}$  inches (7.3 cm) in height). Can you tell us the item number for these supports and the name of the store where they are sold?**

See Q43. This item is sold at the following stores: RONA and Canadian Tire.

**Q47.1. Can a remote control device be used to start up the machine, if it calls for a single action... pushing a button?**

Yes.

**Q47.2. Is the 60 seconds (or 30) allocated for the attempt deducted from the 3-minute preparation time?**

No.

**Q48. Further to the answer given to Question 41.1, would the ball count for 6 points if the vehicle is composed of an arm and a recipient at the end of the arm and if at the end of the attempt, only the recipient is located in the volume of the box... in other words, there's no physical contact between the box and the vehicle (either the recipient or the arm or the rest of the vehicle) nor between the box and the ball; the ball would still be on a part of the vehicle while being in the volume of the box?**

Yes, the balls will be considered as having been "picked up" and "placed" as stipulated in rules 2.1 and 2.2.

**Q49.1 Can you be more specific regarding Rule 2.4, please? What do you mean by *the moment when the last ball is moved*?**

A ball is considered *moved*, when it has left its original position. A ball that moves while remaining on its support is considered to have been moved.

**Q49.2 Do you mean *the moment when a last ball is removed from its support*?**

No. See Q49.1.

**Q50. Question 41.1 has already been asked; would it be possible to answer in greater detail? We want to know the definition of *a ball in the container* and *a ball on the machine*. Should a ball in the container not be in contact with the box alone?**

A ball is considered to have been *placed* in the container when it is located within the inside volume of the container at the end of the attempt. A ball is considered to have been *picked up* by the machine when it is in contact with the machine at the end of the attempt, without touching the floor. The words *placed* and *picked up* refer to the challenge text, lines 2.1 and 2.2. It is possible for a ball to be considered as having been both *placed* and *picked up* if both conditions are met at the end of the attempt.

**Q51. What is the maximum number of points a team can score during an attempt?**

The highest score can be obtained when the 22 balls are on the machine (picked up) and in the container (placed) at the same time. Therefore, the highest possible score is 132. In the event of a tie, see Rule 2.4 or Q50.