2024-25 CHALLENGE

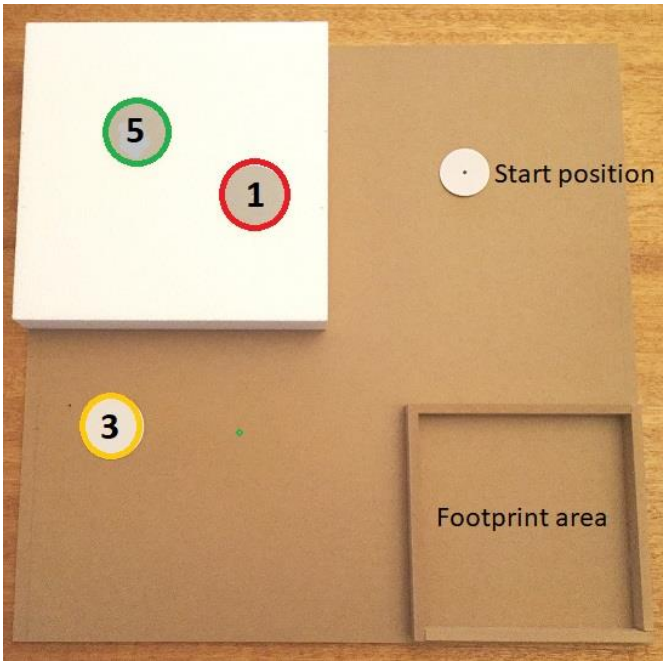
Your team of highly trained experts in the field of Materials Handling has been commissioned to design a controlled pneumatic or hydraulic device that will safely move containers of highly toxic material between storage areas.

THE CHALLENGE:

Your team will design and build a device that picks up containers from the "START POSITION" and then deposit them in one of three locations. The containers, represented by wooden cylinders must be moved, without being dropped, to your chosen position. Your task will be to transport as many cylinders as possible between the start position and any one of the three destination locations in a time frame of two minutes.

SPECIFICATIONS:

The base of your device will sit anywhere within the "FOOTPRINT AREA". The available area is 8" square and it is surrounded by a wall ⅜" wide and 1" high. The plane of the start position, the FOOTPRINT AREA and one of the destination locations ("3") is the same. Two of the destination locations ("1" & "5") are 2" above the plane of the footprint/start position. The destination locations are circles 2½" in diameter.



The wooden cylinders representing the containers are 2¾" high and 1¼" diameter and each cylinder weighs approximately 1½ oz.

SPECIFICATIONS *(continued):*

The cylinders are to be moved from the starting position to one of three locations and placed upright at the chosen destination. Your team can choose a different destination location for each cylinder. The three destinations are worth different points: one (1), three (3) and five (5).

Any cylinder dropped in transit will be returned to its starting position. Once a cylinder is moved to its destination it will be returned to its starting position ready to be moved again.

All movements of the device MUST be controlled using fluid power.

If your team manufactures a device that only works when it is stabilized by hand(s) then 50% of the 'moving object' score will count.

If your team breaks the device during the allocated 2 minutes, then your team can repair it during those 2 minutes and subsequent 'moving object' scores will count 50%

If your device is touched by hand in any other way, then the 'moving object' score will be zero

BEFORE THE COMPETITION:

Your team will design a device to move the cylinders and record your process in a team portfolio. At the Workshop your team will be introduced to the variety of tools and the materials you can use by building two kits that demonstrate movement by pneumatic power. Between the Workshop and the Challenge, you must design your solution. Credit will be given to a well-designed device, particularly one that is strong and stable (e.g. counter-balanced and reinforced with cross struts where appropriate), and one that works effectively.

AT THE COMPETITION:

Working co-operatively your team will build a device and use it to meet the Challenge using the plans in your portfolio and from a Challenge kit that contains the same materials that you take with you to your school for prototyping (with the following additions: 8 glue sticks, two more 20cc syringes, an extra syringe holder and an extra 6ft. of tubing)

Glue stations will only be available after lunch on the competition day. You are encouraged NOT to use hot glue unless it is an emergency – wood glue and cardboard gussets are much stronger and less likely to become loose if in contact with water.

Your team will bring *TWO COPIES* of its portfolio and the tools kit to the competition. The judges will evaluate one of your portfolios and all your team members will be expected to answer questions about the function and design of your device. You will be judged as per the Challenge Rubric.