

Local Fluid Power Challenge Rubric *(detailed)*



| Part A: PORTFOLIO | | | | | |
|--|---|---|---|--|--|
| Success criteria | 5 | 4 | 3 | 2 | 0-1 |
| Quality of portfolio's presentation including title and index pages | Title page contains all elements: school, team #, student's names. Index links to marked pages and the overall presentation is of a high quality | Title page contains all elements: school, team #, student's names. The overall presentation is of a high quality. The Index is missing | Title page contains all elements: school, team #, student's names. The overall presentation is of an average quality. The Index is missing | The overall presentation is of an average quality. The Index and the Title page are missing | The overall presentation is of a poor quality. The Index and the Title page are missing (1) |
| A detailed outline of each team member's participation in the production of the portfolio and planned production of the device | All team members participated in a material way and were familiar with portfolio contents and a production schedule was provided for the device | All team members participated in a material way and were familiar with portfolio contents, however no production schedule was provided | Most team members participated but one or two were not very familiar with portfolio contents. No production schedule was provided | Portfolio was done mostly by one or two students without a planned production of either portfolio or device | One student did portfolio; other team members are not at all familiar with portfolio contents No Portfolio (0) |
| At least three illustrations of the initial design concepts of possible device | Three illustrations that show connecting parts in some detail | Three illustrations, two of which show some connecting parts | Three illustrations, one of which shows some connecting parts | Two illustrations | One illustration (1) No illustrations (0) |
| Materials used to build prototype from the Prototype Kit | A comprehensive list of materials, correctly labeled and including dimensions | A list of all materials used, correctly labeled and including some dimensions | A list of all materials used, correctly labeled without dimensions | A list of some but not all materials with some labels and dimensions | A list of some materials without dimensions (1) No list (0) |
| Description of the use of the principles of structural strength and stability | Uses 5 terms from the following sets: force or load or compression or tension; symmetry or triangulation; center of gravity or balance and counterbalance; support beams or struts; gusset or joining methods; aesthetics | Uses 4 terms from the following sets: force or load or compression or tension; symmetry or triangulation; center of gravity or balance and counterbalance; support beams or struts; gusset or joining methods; aesthetics | Uses 3 terms from the following sets: force or load or compression or tension; symmetry or triangulation; center of gravity or balance and counterbalance; support beams or struts; gusset or joining methods; aesthetics | Uses 2 terms from the following sets: force or load or compression or tension; symmetry or triangulation; center of gravity or balance and counterbalance; support beams or struts; gusset or joining methods; aesthetics | Uses 1 term from the following sets: force or load or compression or tension; symmetry or triangulation; center of gravity or balance and counterbalance; support beams or struts; gusset or joining methods; aesthetics No description (0) |
| Rationale used to decide on the type of fluid power used and where to place the piston-syringes | Explains the position of the piston-syringes in terms of actions (1). In doing so, uses 4 terms from the following sets: pneumatic and hydraulic; system or input and output; density or particle theory; pressure or Pascal's principle; lever or pivot; friction, work done or mechanical advantage | Explains the position of the piston-syringes in terms of actions (1). In doing so, uses 3 terms from the following sets: pneumatic and hydraulic; system or input and output; density or particle theory; pressure or Pascal's principle; lever or pivot; friction, work done or mechanical advantage | Explains the position of the piston-syringes in terms of actions (1). In doing so, uses 2 terms from the following sets: pneumatic and hydraulic; system or input and output; density or particle theory; pressure or Pascal's principle; lever or pivot; friction, work done or mechanical advantage | Explains the position of the piston-syringes in terms of actions (1). In doing so, uses 1 term from the following sets: pneumatic and hydraulic; system or input and output; density or particle theory; pressure or Pascal's principle; lever or pivot; friction, work done or mechanical advantage | Explains the position of the piston-syringes in terms of actions (1). No explanation (0) |

| <i>Success criteria</i> | 5 | 4 | 3 | 2 | 0-1 |
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| An isometric drawing of the portion of the prototype used to grab the object | The isometric drawing is properly dimensioned and of high quality | The isometric drawing is of good quality with some correct dimensions | The isometric drawing of fair quality with some correct dimensions | The isometric drawing is of fair quality without dimensions | The isometric drawing is poor without dimensions (1) No isometric drawing (0) |
| An orthographic drawing showing dimensions and construction notes for the entire device | The orthographic drawing shows front, side and plan views and is drawn so the scaled dimensions relate to the views and includes notes | Three orthographic drawings are presented showing front, side and plan views using a consistent scale | Three orthographic drawings are presented showing front, side and plan views using an inconsistent scale | Only two of three orthographic drawings are available | Only one of three orthographic drawings are available (1) No drawings (0) |
| A list of alternative materials that would have been useful with reasons why they would have been so | At least three new materials are listed and the current materials are commented on. Reasons are given as to why the new materials would be useful | At least two new materials are listed and the current materials are commented on. Reasons are given as to why the new materials would be useful | At least two new materials are listed and reasons are given as to why the new materials would be useful | Two new materials are listed. No reasons are given as to why the new materials would be useful | One new material is listed. No reasons are given as to why the new materials would be useful (1) No new materials listed (0) |
| Evaluation of a prototype including conclusions from making it | A good description of two prototypes and thorough documentation of lessons learned including reasons for choosing one of the prototypes. | A good description of a prototype and documentation of lessons learned with conclusions | A fair description of a prototype and poor documentation of lessons learned | A poor description of prototype and poor documentation of conclusions | No description of prototype and no documentation of conclusions (1) No mention of prototype or conclusions (0) |

Part B: TEAMWORK & WORK HABITS

| <i>Success criteria</i> | 5 | 4 | 3 | 2 | 0-1 |
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| Members of the group work independently and co-operatively in an organized way | All team members work co-operatively sharing the workload in a planned way by working in pairs and individually | All team members work co-operatively sharing the workload by working in pairs and individually without an organized plan | 3 team members work co-operatively sharing the workload by working in pairs and individually. One team member participates minimally | 2 team members work co-operatively sharing most of the workload. The remaining members participate minimally | 1 team member does most of the work on their own with the remaining members participating minimally (1) The team participates minimally (0) |
| Members of the group demonstrate safe working practices | Team members wear safety glasses while cutting and drilling using the appropriate tools safely with materials held in a secure way | Team members wear safety glasses while cutting and drilling using the appropriate tools safely with material held in an insecure way | Team members wear safety glasses while cutting or drilling using the inappropriate tools with material held in an insecure way | Some team members do not wear safety glasses while cutting or drilling using inappropriate tools with material held in an insecure way | Only one team member wears safety glasses while cutting or drilling (1) No team member wears safety glasses while cutting or drilling (0) |

| Part C: DEVICE DESIGN, CONSTRUCTION AND OPERATION | | | | | |
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| <i>Success criteria</i> | <i>5</i> | <i>4</i> | <i>3</i> | <i>2</i> | <i>1</i> |
| The device uses materials effectively and is well constructed with parts securely attached | The device has all parts securely attached. The materials are used efficiently | The device has all parts securely attached. There are materials that perform a moderately useful function | The device has most, but not all, parts attached. There are materials that perform a moderately useful function | The device has some parts attached and there are redundant materials that perform no useful function | The device has few parts attached and there are redundant materials |
| The device itself operates efficiently and is operated in an organized way | The device operates smoothly without any glitches and the team works together efficiently | The device operates with a minor glitch and the team successfully fixes it | Initially the device operates efficiently however one piston becomes inoperative despite team efforts to fix it | Breakage immediately occurs when force is applied to the device and the team members are unable to fix it | The device does not work (0) |
| TOTAL TEAM SCORE: | SUMMATION OF SCORES | | | | |
| | Portfolio (50) | Teamwork & Work Habits (10) | Device Design, Construction and Operation (10) | Interview Questions (20) | Points accumulated in designated time period |
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| Part D: INTERVIEW QUESTIONS |
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| 1: What alternative designs did you look at before selecting the design you are building? |
| 2: Why did you select this design to use for the Challenge? |
| 3: What did you find most difficult with the project overall? |
| 4: How did you decide who on your team would be responsible for which parts of the project? |