Judges' Rubric

	Part A: PORTFOLIO (50 Possible Points)				
Success criteria	***5***	***4***	***3***	***2***	***1-0***
Quality of portfolio's presentation including title and index pages	Title page contains all elements: school, team #, and student's names. Index links to marked pages and the overall presentation is high quality.	Title page contains all elements: school, team #, and student's names. The overall presentation is of a high quality. The Index is missing.	Title page contains all elements: school, team #, and student's names. The overall presentation is of an average quality. The Index is missing.	Overall presentation is of an average quality. The Index and the Title page are missing.	Overall presentation is of a poor quality. The Index and the Title page are missing (1).
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 prepared portfolio. The 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 provided.	One illustration (1); No illustrations (0)
Materials used to build prototype from the Workshop Kit	Comprehensive list of materials provided, correctly labeled, and includes dimensions.	List of all materials used, correctly labeled, and includes some dimensions.	List of all materials used, correctly labeled, but without dimensions.	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;	Uses **4 terms** from the following sets: force or load or compression or tension; symmetry or triangulation; center of gravity or balance and counterbalance;	Uses **3 terms** from the following sets: force or load or compression or tension; symmetry or triangulation; center of gravity or balance and counterbalance;	Uses **2 terms** from the following sets: force or load or compression or tension; symmetry or triangulation; center of gravity or balance and counterbalance;	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; or aesthetics	support beams or struts; gusset or joining methods; or aesthetics	support beams or struts; gusset or joining methods; or aesthetics	support beams or struts; gusset or joining methods; or aesthetics	support beams or struts; gusset or joining methods; or aesthetics No description (0)
Success Criteria	***5***	***4***	***3***	***2***	***1-0***
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).
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.	Isometric drawing is poor without dimensions (1); No isometric drawing (0).
An orthographic drawing showing dimensions and construction notes	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).

Success Criteria	*5*	*4*	*3*	*2*	*1-0*
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: WORK HABITS (10 Possible Points)				
Success criteria	***5***	***4***	***3***	***2***	***1-0***
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) Team participates minimally (0).
Members of the group demonstrate safe working practices	All 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.	One team member wears safety glasses while cutting or drilling (1); No team member wears safety glasses at any time (0).

	Part C: DEVICE DESIGN AND OPERATION (10 Possible Points)				
Success criteria	***5***	***4***	***3***	***2***	***1-0***
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	Device operates smoothly without any glitches, and the team works together efficiently.	Device operates with minor glitches, and the team successfully fixes it.	Device initially operates efficiently, but one piston becomes inoperative despite efforts to fix it.	Breakage immediately occurs when force is applied to the device; team members are unable to fix the device.	Device does not work (0).
	TALLY SCORES				
	Portfolio (50 Points)	**Work Habits (10 Points)**	**Device Design & Operation (10 Points)**	**Interview Questions (20 Points)**	**Total Points Accumulated**
TOTAL TEAM SCORE:					

Interview question A: (5 Possible Points) What alternative designs did you consider before selecting the design you are building?
Interview question B: (5 Possible Points) Why did you select this design for the challenge?
Interview question C: (5 Possible Points) Overall, what did you find most difficult with the project?
Interview question DL (5 Possible Points) How did the team decide who would be responsible for each part of the project?