SATEC@Porter CI – Technological Design

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Abbreviations:

K = Knowledge / Understanding (Knowing) T = Thinking / Inquiry (Processing, Planning)	A = Application (Doing, Practising) C = Communication (Reporting)		(nn) = Mark out of nn

Problem-Solving / 3D CAD Product Solution Marking Scheme

- Some – but not all -- requirements / criteria for the product will have been stated by the teacher in the scenario / assignment
- So, the student must also declare ***additional*** requirements / criteria in their Requirements document (eg 13 concepts). Hence, for effective problem-solving, documentation is always required along with CAD models.

Range %	Student Shows / Has Done…	But Does Not Show in the CAD files... As Well As Design Problem Documentation Issues
<41	Only basic sketches Geometric constraints which were simply automatically inferred by the CAD applic Very short Requirements document	No dimensions No other geometric constraints There are many undesirable degrees of freedom Very little evidence that the student even understands the problem or has a sense of the goal. Design Brief "misses the point" in the scenario. Requirements document is a list of some of the fundamental concepts but without useful context. Requirements document "misses" several of the teacher's requirements.
41-50	Only basic sketches Some dimensions and student-applied geometric constraints such as =	Parameters do not have meaningful names There are several undesirable degrees of freedom Modest evidence that the student understands limited elements of the problem. Requirements document does not address some important fundamental concepts of technology – or addresses them in only a trivial or superficial way.

Range %	Student Shows / Has Done…	But Does Not Show in the CAD files... As Well As Design Problem Documentation Issues
51-55	Only one part file All features have had sketches consumed (extrude, revolve etc).	Supporting sketches are not fully constrained (has some degrees of freedom) No .idw Shows some understanding of the problem through parameter naming etc. but there is no real sense, either in the CAD model or in supporting documentation, of how the part could perhaps help solve the stated problem.
56-60	There are two or more parts which look as though they might fit together to become a product of some kind Most sketches are fully constrained	No iam, idw No meaningful names for solids, parameters, features It is rather unclear how the parts will solve the problem. Supporting documentation includes no specifications that could potentially lead to a partial solution.
61-65	Two or more parts were decently-thought-out and may become a minimalist product that might satisfy at least 10% of the Requirements Some meaningful names for solids, parameters, features All sketches are fully constrained	iam is not properly constrained No idw Supporting documentation includes minimal specifications that could potentially lead to a partial solution. Parts show structure and mechanisms. Student shows some minimal understanding of a partially valid white box model. But the product is unlikely to actually "work" to achieve the goal.
66-70	Most appropriate design strategy was used: -Bottom-up for multiple identical parts -Top-Down for system-restricted situation -Middle-Out / Blended / Multiple-Solid-Master Some meaningful names for solids, parameters, features Product appears to modestly satisfy at least 50% of the requirements (including most relevant of the 13 fundamental concepts)	iam is not properly constrained No idw Parameter-naming does not follow any logical pattern with helpful pre-fixes or suffixes Supporting documentation includes several specifications that could potentially lead to a partial solution.

Range %	Student Shows / Has Done…	But Does Not Show in the CAD files... As Well As Design Problem Documentation Issues
	Product looks as though it may very modestly "work" to solve the problem. Student shows a modest understanding of a decent white box model.	Supporting documentation does not address logical / sensible / reasonable sub-systems.
71-75	Most solids, and significant parameters and features have meaningful names using a value-added prefix and suffix convention Product appears to modestly satisfy at least 60% of the requirements Product looks as though it may modestly "work" to solve the problem Student shows a solid understanding of a valid white box model.	iam is almost properly constrained No idw Reasonable sub-systems have been identified in supporting documentation. Supporting documentation demonstrates that the student has planned his or her design intent carefully and thoroughly such that a CAD solution can reasonably be achieved.
76-80	All solids have meaningful names Most significant parameters and features have meaningful names .iam is properly constrained Product appears to reasonably satisfy at least 70% of the requirements Product looks as though it will actually "work" reasonably well	idw files are generated but: -not dimensioned properly -title block is incomplete -no parts list / bill of materials -no fabrication notes
81-85	All solids (and features upon which they are based) have meaningful names All significant parameters have meaningful names Key parameters have been flagged as key Some user parameters have been declared (system-related) and referenced in model equations for other parameters .iam is properly constrained .idw file(s) is fully dimensioned and will be reasonably valuable as a shop drawing Product appears to reasonably satisfy at least 80% of the requirements	Some .idw files are lacking: -title block is incomplete -no parts list / bill of materials -no fabrication notes The requirement to generate a second model variation (eg larger or smaller) using an equation(s) is not attempted Student shows no understanding of the physical issues / parameters that are necessary for an appreciation of the second model variation.
86-90	All solids (and features upon which they are based) have meaningful names All significant parameters have meaningful names Key parameters have been flagged as key All necessary user parameters have been declared (system-related) and referenced in model equations for other parameters	The requirement to generate a second model variation (eg larger or smaller) using an equation(s) is only partially complete Student shows limited understanding of the physical issues / parameters that are necessary for an appreciation of the second model variation.

Range %	Student Shows / Has Done…	But Does Not Show in the CAD files... As Well As Design Problem Documentation Issues
	All significant features have meaningful names .iam is properly constrained Half of the necessary .idw file(s) are fully dimensioned and will be reasonably valuable as shop drawings -.idw title block is complete -parts list / bill of materials and fabrication notes are included on the most appropriate drawings Product appears to reasonably satisfy at least 90% of the requirements	
91-95	Complies with the criteria immediately above and, in addition: -All of the necessary .idw file(s) are fully dimensioned and annotated and will be very valuable as shop drawings Product appears to reasonably satisfy at least 95% of the requirements The requirement to generate a second model variation (eg larger or smaller) using an equation(s) is complete and satisfies requirements	
96-100	Complies with the criteria immediately above and, in addition: Exceptional work Product satisfies all requirements (eg the relevant fundamental concepts) A reasonably competent person could accurately produce the product using the shop drawings (idw printouts) (and any fabrication procedures that were provided by the student designer)	