

Coach/Student Guide to the Engineering Notebook Rubric

CRITERIA	Criteria Description / Explanation / Questions (page 1 of 4)
IDENTIFY THE PROBLEM / DESIGN GOAL(S)	Clearly identifies the problem/design goal(s) at the start of each design process cycle. This can include elements of game strategy, robot design, or programming, and should include a clear definition and justification of the design problem(s), goal(s), criteria, and constraints.
	The engineering design process is about creating a solution to an engineering problem. An expert notebook provides great details for: problem identification, game strategy, robot design/programming, and clear justification of design goals, criteria, and constraints.
	☐ Is the challenge of the game clearly defined? ☐ Are goals to overcome these challenges clearly defined? ☐ Are key criteria and constraints that guide the solution defined and justified? ☐ Are other challenges defined after the initial challenge? ☐ Are the above criteria repeated for each design cycle?
BRAINSTORM SOLUTIONS	Explores different solutions with explanation. Citations are provided for ideas that came from outside sources such as online videos or other teams.
	The engineering design process is about exploring different solutions, including reviewing solutions that others have come up with. An expert notebook explores several solutions with explanations and citations for ideas that came from outside sources.
	☐ Are multiple solutions explained, including the chosen solution? ☐ Were ideas that were inspired by something else cited?
SELECT BEST SOLUTION	Explains the “why” behind design decisions in each step of the design process for all significant aspects of a team’s design.
	Providing justification for decisions made can help in current and future adjustments to the design. An expert notebook fully explains design decisions.
	☐ Are key constraints identified and their impact on the design explained? ☐ Are rationales, testing information, or a decision matrix used to explain major decisions?

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BUILD AND PROGRAM THE SOLUTION	Records the steps the team took to build and program the solution so that the reader can follow the logic used by the team to develop their robot design, as well as recreate the robot design process from the documentation.
	Recording the building and programming steps can help if a disaster happens, such as a robot falls on floor or a program is erased, the design can be reproduced. An expert notebook contains full detail about the designs build and programming.
	☐ Are the build and programming steps documented in detail and in chronological order? ☐ Are pictures and/or diagrams explained? ☐ Can you recreate the solution from the entries?
ORIGINAL TESTING OF SOLUTIONS	Records the steps to test the solution, including test results. Testing methodology is explained. Testing results are original to the team and explained, and conclusions are drawn from that data.
	Explaining the test plan and documenting test results helps in the justification of design decisions. In an expert notebook, all steps are recorded and clearly explained, and the results are original to this team.
	☐ Is it explained how and why certain aspects of the design were chosen to be tested? ☐ Is the team doing their own testing? ☐ Is the team interpreting test results?
REPEAT DESIGN PROCESS	Shows that the design process is repeated to work towards a design goal. This process can be repeated in full iterations or for specific parts of the overall design. The notebook shows setbacks that the team learned from, and shows design alternatives that were considered but not pursued.
	The engineering design process is built on repeating the process until the identified problem meets the defined goals, criteria, and constraints. In an expert notebook, the design process is repeated multiple times, showing setbacks and/or alternatives pursued.
	☐ Are multiple design cycles defined? This could be complete solutions or smaller changes to improve a previous design. ☐ Does the team show what worked, what did not, and the path they took to arrive at their current design?

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INDEPENDENT INQUIRY	Team shows evidence of independent inquiry of their design process. Notebook documents whether the implemented ideas have their origin with students on the team, or if students found inspiration elsewhere.
	Exploring, experimenting, and discovery is an important part of learning and the engineering design process. An expert notebook will show evidence through the whole process with sources documented.
	☐ Is the team working through the engineering design process from start to finish? ☐ Is the team properly crediting sources of information or inspiration for ideas?
USABILITY & COMPLETENESS	Records the design and development process with enough clarity and detail that the reader could recreate the project's history. Notebook has recent entries that align with the robot the team has brought to the event.
	An expert notebook records the entire design, consistently, and is current.
	☐ Does the team record their entire process, and not just what worked, or the end product? ☐ Is the notebook up to date?
ORIGINALITY & QUALITY	Content is kept to relevant information and all content not original to the team is located in appendices to the engineering notebook. Information originating from outside the team is always properly cited in the notebook with the source and date accessed. Engineering notebook content is original to the submitting team members.
	In an expert notebook, content is relevant, appropriately placed, properly cited, and original to the team.
	☐ Does the notebook consist of the team's own work? ☐ Is content not original to the team placed in an Appendix to the Engineering Notebook? ☐ Does the team properly cite external ideas and information?

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ORGANIZATION / READABILITY	Entries are logged in a table of contents. Organization makes it easy to reference, such as color coded entries, tabs for key sections, or other markers. Notebook contains little to no extraneous content that does not further the engineering design process.
	An expert notebook is well organized with a table of contents and has little to no extraneous content .
	☐ Is there an up-to-date table of contents? ☐ Is formatting made for easier use as a reference document later, including a table of contents, reference and other non-design process materials put in an appendix, design cycles identified, and the notebook is easy for a reader to follow?
RECORD OF TEAM & PROJECT MANAGEMENT	Provides a complete record of team and project assignments: – Contains team meeting notes including goals, decisions, and building/coding accomplishments. – Design cycles are easily identified. – Resource constraints including time and materials are noted throughout. – Notebook has evidence that documentation was done in sequence with the design process. – Entries include dates and names of contributing students.
	An expert notebook records all information listed .
	☐ Are team assignments recorded? ☐ Do meeting notes include goals, decisions, and accomplishments? ☐ Are design cycles identified? ☐ Does the notebook address resource constraints and personnel management? ☐ Are entries dated and are done in sequence with the design process? ☐ Are the names of the students involved in each entry in the notebook included?