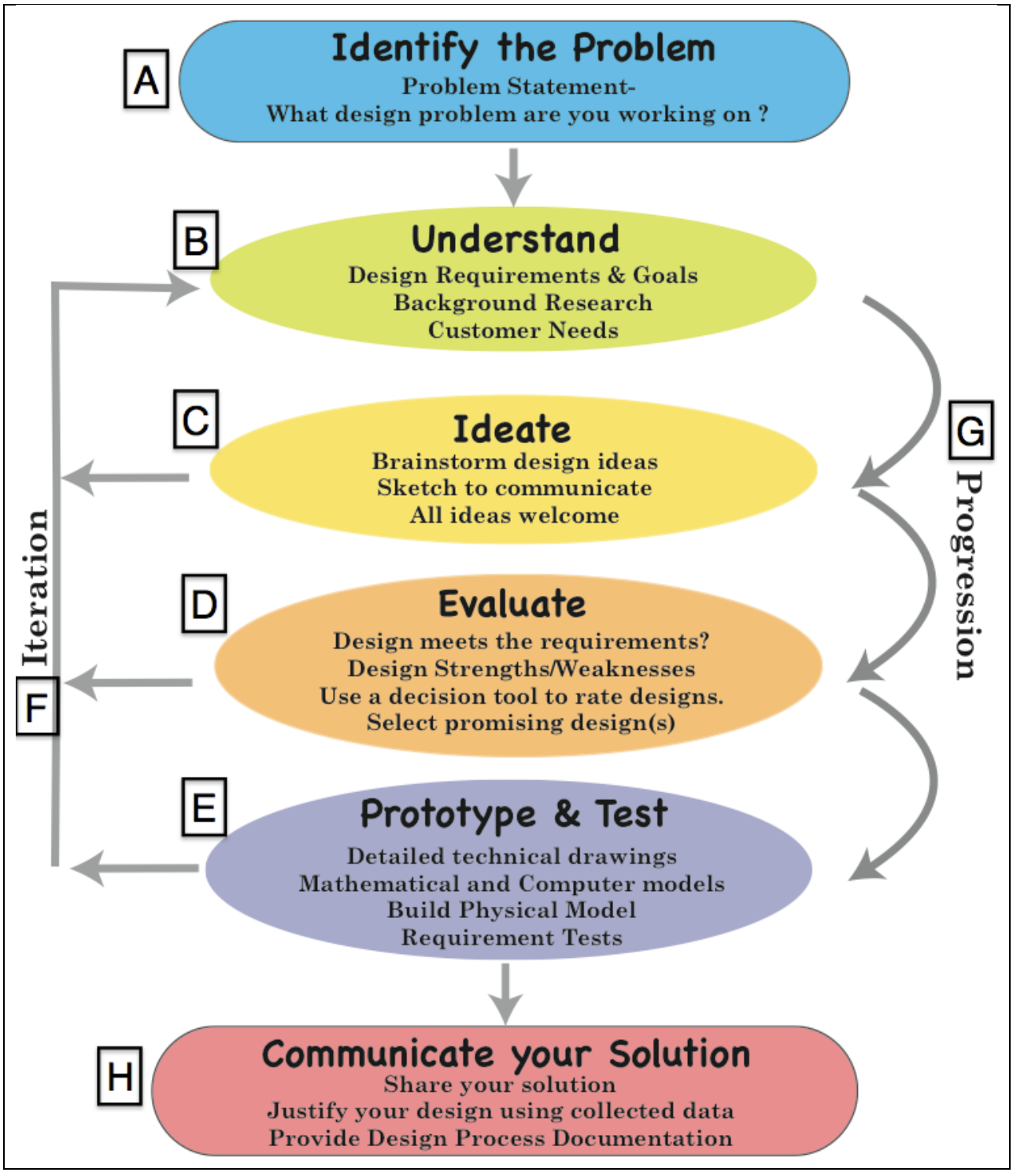
Engineering Design Process Portfolio Scoring Rubric:
Adapted for AMP Middle School Portfolios



***Element A*: Identify the Problem**

Score Point	Performance Level	Performance Level Description
3	*Advanced*	The problem is identified and defined with **adequate depth**, and it is **sometimes elaborated with specific detai**l, although some information intended as elaboration may be imprecise or general. The problem statement includes a need and a market or client. The problem statement may imply a certain class of solutions.
2	*Proficient*	The problem is identified and defined but may be lacking specific detail. The problem statement may be a paraphrase of a given problem statement, but includes at least a need and/or a market or client. The problem statement may favor a particular solution.
1	*Developing*	The identification and/or definition of the problem is **unclear and/or is clearly subjective.** The problem statement may imply the solution without a clear illustration of the need or the client.
0	*No Evidence*	The identification and/or definition of the problem are **missing** OR **cannot be inferred** from information included.

Guidelines for Proficiency:

• I described the exact problem clearly, including a need and a client or market.	
• My description of the problem includes information about the background, context, or setting for the problem.	

Element B: **Understand**

Score Point	Performance Level	Performance Level Description
3	*Advanced*	Design requirements are **listed with dates** that indicate when they were added to the list, and generally include an **appropriate source**. The requirements are **somewhat measurable**, and may **lead to a viable solution** to the problem identified. There is evidence that requirements represent the needs of the client or customer. The sources for the requirements may include evidence of market research and testing of initial prototypes. Some requirements may be solution specific.
2	*Proficient*	Design requirements are **listed with dates** that indicate when they were added to the list along with meaningful sources for some of the requirements. **Some/all of these requirements may be vague or hard to measure**, and may not lead **to a viable solution** to the problem identified. There is some evidence that the requirements represent the needs of the client or customer, but sources may not be credible. There may not be evidence of market research and testing of initial prototypes.
1	*Developing*	**An attempt is made to list** requirements, but these generally do not include meaningful sources. The requirements may be **partial and/or overly general**. There is little or **no evidence** that the requirements represent the needs of the client or customer, and may not include sources**.** There is no evidence of market research or testing of initial prototypes.
0	*No Evidence*	Design requirements are **not presented or do not make sense with respect to the problem identified**.

Note: The level of requirements that a student provides differentiates between the levels. Additionally, if there are no sources (marketing research etc.), rater should begin no higher than "Developing" level.

Guidelines for Proficiency:

• I listed a set of design requirements (for example: The device must operate correctly more than 90% of the time.).	
• I included a source for each design requirement, such as a client, user, background research, or test results.	
• I indicated the date on which each design requirement was added to the list.	

Element C: **Ideate**

Score Point	Performance Level	Performance Level Description
3	*Advanced*	**Multiple sketches** for potential solutions were provided; the sketches provided some **detail** to communicate each design.
2	*Proficient*	**One or more sketches** for potential solutions were provided; the sketches were **general and provided partial details** about each design.
1	*Developing*	**One or more sketches** for a potential solution may have been provided; the sketches included **insufficient detail to communicate each design.**
0	*No Evidence*	**No sketches** for potential solutions were provided.

Note: Student should provide more than one concept, should provide multiple ideas, and should not be merely justifying one preferred idea.

Guidelines for Proficiency:

• I sketched multiple potential solutions.	
• My sketches provided enough details to show each of my designs. (e.g.: labeling key parts or features)	

Element D: **Evaluate**

Score Point	Performance Level	Performance Level Description
3	*Advanced*	Students used a decision tool to rate each of their potential design solutions. The process for comparing possible designs solutions based on strengths and weaknesses was generally defensible. The choice of design solution was explained with reference to **at least some** design requirements.
2	*Proficient*	Students used a decision tool to rate each of their potential design solutions. The process for comparing possible design solutions may be superficial. The solution pathway was **not explained** with reference to design requirements.
1	*Developing*	The proposed design was superficially reviewed based on one or two considerations. The choice of design solution **lacked support related** to design requirements.
0	*No Evidence*	There is **no evidence provided** that a design solution was reviewed based on design requirements.

Note: Starting from this element the rater should start reviewing the reflection section. Student should provide more than one concept, should provide multiple ideas, and should not be merely justifying one preferred idea.

Guidelines for Proficiency:

• I decided if each of my possible solutions might meet the design requirements.	
• I described what is good or bad about each design.	
• I described why the design solution I chose was the best one to try based on the requirements.	

Element E: **Prototyping and Testing**

Score Point	Performance Level	Performance Level Description
3	*Advanced*	A final prototype (or multiple prototypes, if possible) is designed and/or constructed with enough detail to assure that **most design requirements** could be tested. The tests for each requirement are documented.
2	*Proficient*	Prototypes are designed and/or constructed with enough detail to assure that **at least a few design requirements** could be tested. **The tests for the requirements are briefly descriped**.
1	*Developing*	Prototypes are **only minimally explained** and/or constructed. **Test results may be missing or unclear.**
0	*No Evidence*	Prototypes are **unclear or missing** altogether. There is **no evidence that the prototype would facilitate testing** by suitable means for any of the design requirements.

Note: In the logs, the iteration is embedded in this stage. There is no separate tab for iteration.

Guidelines for Proficiency:

• I created detailed drawings for my solution.	
• Where possible, I created computer models for the solution.	
• I built a physical model of my solution.	
• I tested my design to show that it meets all of the design requirements.	

Element F: **Iteration**

Score Point	Performance Level	Performance Level Description
3	*Advanced*	The project designer **provides a generally clear reflection** on **major steps** in the project. The reflection **includes at least one lesson learned**. There is evidence of iteration in either design concepts or prototypes.
2	*Proficient*	The project designer provides a **generally clear reflection** on at least one step or decision made during the project. At least one improvement was made to a design concept or prototype or a reflection indicates a future improvement plan.
1	*Developing*	The project designer **provides a reflection** on a major step in the project, although the **reflection may be partial**, overly-general and/or superficial. There may be no evidence of improvements or iteration or any plans for iteration.
0	*No Evidence*	There is **no evidence of a reflection and/or lessons learned.** There is no evidence of iteration or improvement in the design process.

Note: If the student does not provide more than one concept in the earlier stages, then iteration evidence might not exist. Again, the reflections are important to review for this section.

Guidelines for Proficiency:

• I made improvements to my design through an iterative process.	
• I wrote a reflection about my design process.	
• My reflection describes my decisions I made and why I made them.	
• My reflection describes what I would do differently if I tried to address the problem again or how I would proceed with improving my solution given more time to do so.	

Element G: **Progression**

Score Point	Performance Level	Performance Level Description
3	*Advanced*	The portfolio provides **generally clear documentation** of the design process that would be **likely to facilitate subsequent** refinement by the designer(s) and/or others.
2	*Proficient*	The portfolio provides **partial or sometimes overly general documentation** of the design process and project that would be **unlikely to facilitate subsequent** refinement by the designer(s) and/or others.
1	*Developing*	The portfolio provides **minimal documentation** of the design process and project that would **not facilitate subsequent** refinement by the designer(s) and/or others. The portfolio may contain only one design alternative, indicating fixation.
0	*No Evidence*	The portfolio **is incomplete, indicating either a lack of a systematic design process or early evidence of design fixation**.

Note: If only one concept is provided, there is not much evidence of progression.

Guidelines for Proficiency:

• I reviewed my Engineering design log to make sure I included relevant documentation of each stage of the design process.	
• My portfolio provides enough detail to guide someone else in following my design process.	
• My portfolio indicates that I followed a true engineering design process driven by customer needs and requirements, and that multiple design solutions were considered and improved throughout the process.	

Element H: **Communicate your Solution***

Score Point	Performance Level	Performance Level Description
Score Point	**Performance Level**	**Performance Level Description**
3	*Advanced*	**Content:** Presentation communicates the topic in a clear and compelling manner, exhibiting a high level of knowledge on the solution being presented. Presentation includes at least two types of data (financial, stakeholder, test results, research) with appropriate analysis and visualizations to justify design decisions and/or present a compelling sales pitch. A designed solution is communicated using at least one of the following: physical prototypes, drawings, and renderings, as appropriate. The presentation is audience appropriate. **Skill:** Presenter(s) spoke clearly, did not read off of slides, and adhered to the time limits.
2	*Proficient*	**Content:** Presentation communicates the topic in a somewhat clear and compelling manner. Presentation exhibits some use data to justify design decisions and/or present a compelling sales pitch. There is some evidence of data analysis and visualization. A designed solution is communicated using physical prototypes, drawings, and renderings, as appropriate, but some details may not be clear. Presentation is mostly audience appropriate. **Skill:** Presenter(s) adhered to the time limits and did not read off of slides.
1	*Developing*	**Content:** Presentation communicates a clear design solution or a clear use of data, but maybe not both. The presentation contains some visual media and a description of the solution. The presentation may not be tailored to the appropriate audience. **Skill:** Presenter(s) adhered to the time limits.
0	*No Evidence*	Presentation shows work and effort but is vague or missing key elements necessary to communicate the solution, or, presentation quality is lacking even if designed solution is complete.

Note: Team discussed that this is an important element to determine student understanding of EDP. * Note: Adapted from SmartLab Project Self-Assessment Rubric.

Guidelines for Proficiency:

• My presentation communicates my design or solution clearly, including models, renderings, and prototypes as appropriate (more than one item from this list required for 4 or 5).	
• My presentation incorporated data from multiple sources, including visualizations (more than one data source required for 4 or 5).	
• My presentation showcases my expertise in using the software, hardware, or materials that my group used to make our solution.	
• I designed my presentation for the appropriate audience.	
• I adhered to presentation standards for eye contact, articulation, posture, and timing.	