NASA STEM Engagement Evidence-Based Program Design Framework: A Tool for New and Existing Program Design and Re-Design

The NASA STEM Engagement Evidence-Based Program Design (EBPD) Framework (see Figure 1) is intended to guide internal NASA stakeholders in developing new and re-designing existing programs, projects, and investments. New programs can use this framework as a tool for designing programs, projects, and investments. Existing NASA OSTEM program, projects, and investments can use the framework to re-design their program to ensure alignment to evidence-based practices.

The framework is grouped into four categories: program research (Steps 1, 2a, and 2b), program creation (Steps 3a and 3b), program evaluation and improvement cycle (Steps 4, 5, 7, and 8), and program implementation (Steps 6 and 9). A brief description of the framework steps can be found on the next page.

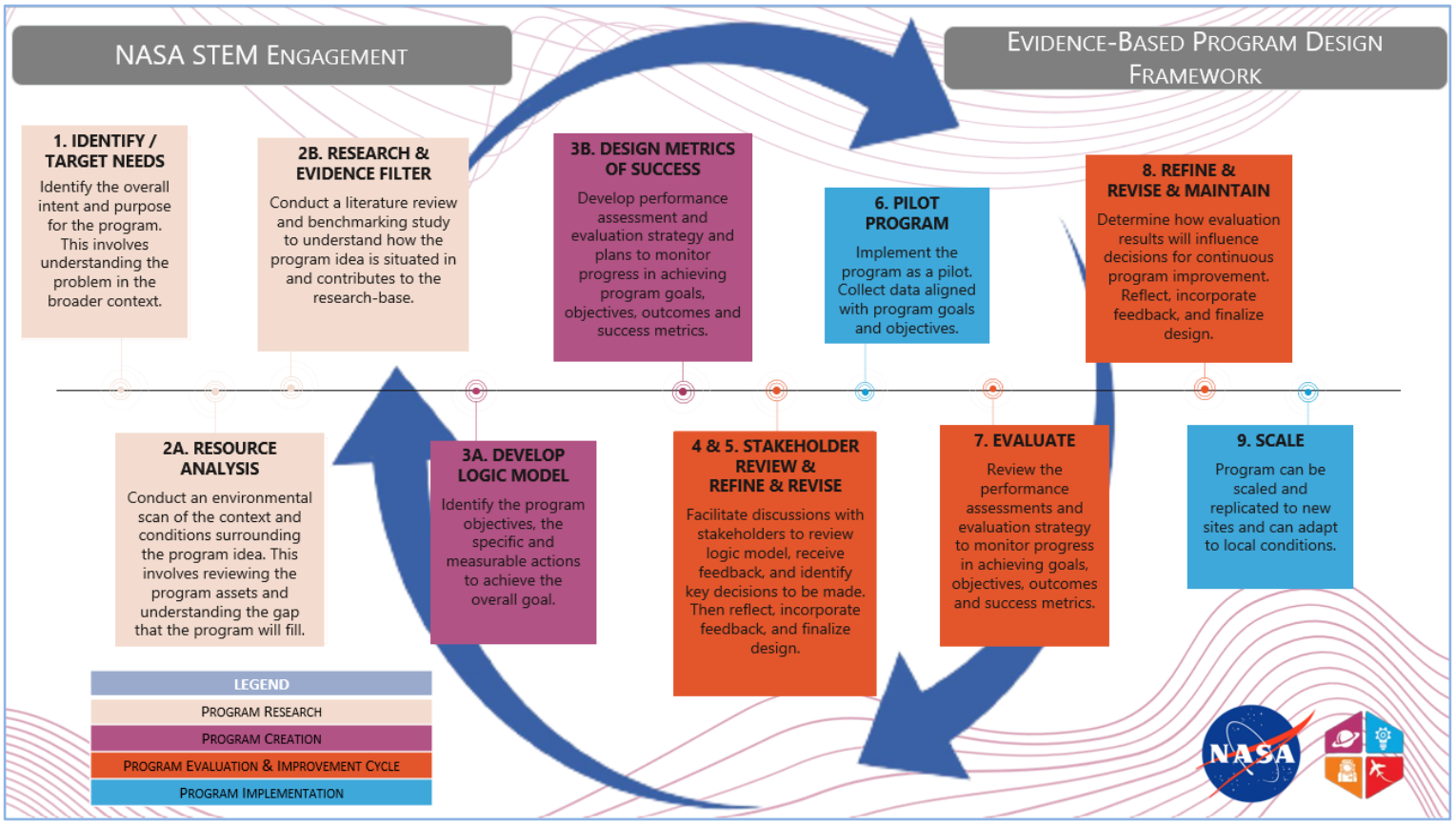

Figure 1. NASA STEM Engagement EBPD Framework

At a Glance – Brief Description of the NASA STEM Engagement EBPD Framework

Action	Explanation
Step 1: Identify and Target Needs to Address	Identify the overall intent and purpose for the program. This involves understanding the problem in the broader context to see how the program can best advance existing strategies, NASA goals, and other federal directives. For program review and re-design this step allows you to consider changes in context, participant needs, or community environment.
Step 2a: Conduct a Resource Analysis	Analyze the context and conditions, SWOT (strengths, weaknesses, opportunities, and threats) surrounding the program, local challenges, and capacity through situational analysis and asset mapping.
Step 2b: Research and Evidence Filter	Use literature review and/or a benchmarking study to ensure the program is grounded in evidence and research. This analysis reduces redundancy and duplicative efforts and ensure the program addresses a well-defined need using effective methods.
Step 3a: Develop a Logic Model and Theory of Change	Create a theory of change to show the principal theory that guides the program. Create a logic model to show the relationships between program investments, activities, and desired results. For program review and re-design, revisit your logic model and theory of change to review how well it describes your program as implemented and whether updates or revisions might be needed.
Step 3b: Design Metrics of Success	Develop the evaluation strategy and plan for monitoring the program's progress towards achieving goals, objectives, and outcomes. In this step, identify the specific data that will measure program success. For program re-design, review your data collection and analysis strategy and consider whether it might be time to modify your strategy based on program accomplishments.
Step 4: Stakeholder Review	Facilitate discussions with internal stakeholders, intended program participants, and community partners to review the logic model and theory of change, discuss resources and needs, receive feedback, and identify key decisions to be made.
Step 5: Refine, Revise, and Maintain	Reflect on stakeholder discussions, incorporate feedback, and finalize the design to be piloted. This phase provides an explicit opportunity to review evidence and feedback and synthesize all information to make informed decisions. For program review and re-design, invite stakeholders to provide feedback for continuous program improvement.
Step 6: Pilot the Program	Implement the program as a pilot with the intended program participants. Collect data during program implementation to monitor progress towards intended goals and objectives.
Step 7: Evaluate	Evaluation allows for a comparison between the metrics of success that were created for the program and program results to assess program success. For program review and re-design, evaluation findings offer contextualized evidence of success and potential areas for improvement.
Step 8: Refine, Revise, and Maintain	Reflect on the implementation process and outcomes, incorporate feedback, and revise or finalize the program design. This cycle can include multiple iterations of revisions. If the goal of the program, process, or investment is sustained implementation, then the framework process ends here with continuous evaluation and progress monitoring of future program implementation.
Step 9: Scale the Program	If a goal of the program, process, or investment is to scale the program to new sites or to a larger size, the final step of the process is to replicate or expand the program.

NASA STEM ENGAGEMENT EVIDENCE-BASED PROGRAM DESIGN FRAMEWORK

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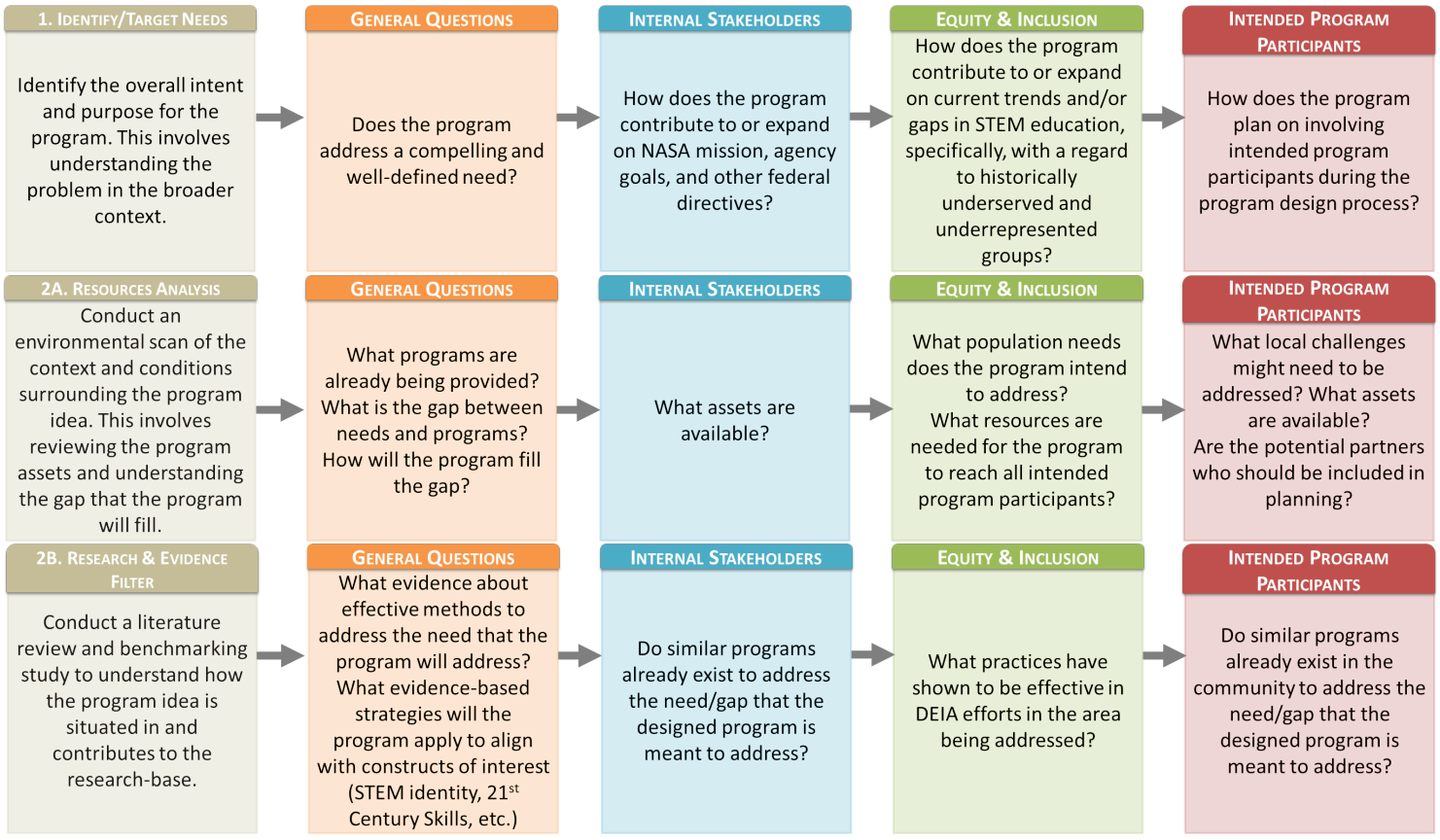
Materials: What materials would you need to enact this step within the EBPD Framework?

Support: What support would be helpful to enact this step within the EBPD Framework?

Questions: What questions do you have about this step within the EBPD Framework?

Phase 1: Program Research



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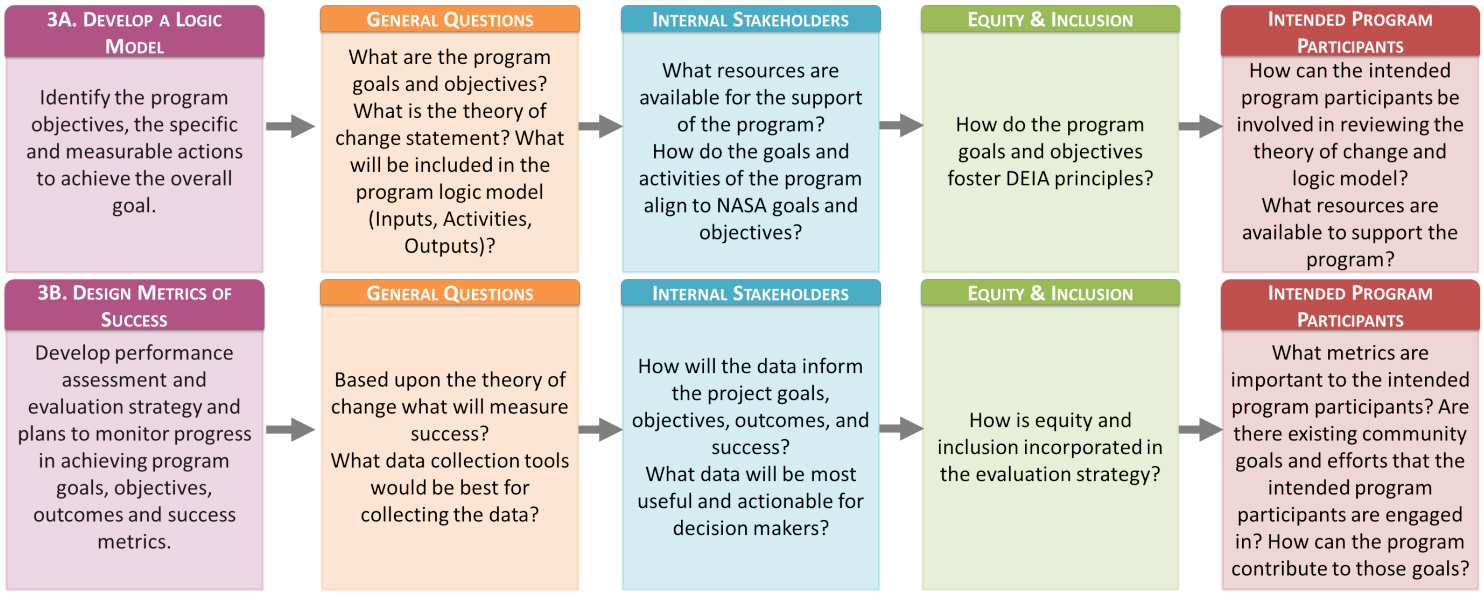
Phase 2: Program Creation



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Phase 3: Program Evaluation & Improvement Cycle

	General Questions	Internal Stakeholders	Equity & Inclusion	Intended Program Participants
4 & 5. Stakeholder Review & Refine and Revise Facilitate discussions with stakeholders to review logic model, receive feedback, and identify key decisions to be made. Then reflect, incorporate feedback, and finalize design.	What improvements can be made to the program?	How does the feedback from discussions with stakeholders inform changes to the program plan? Is the program ready to pilot or are revisions needed?	How does the program connect to the intended program participants? What changes can be made to reach the intended program participants more effectively?	Has input been provided from those most affected by the program? How does this feedback inform changes to the program plan?
7. Evaluate Review the performance assessments and evaluation strategy to monitor progress in achieving goals, objectives, outcomes and success metrics.	Was the program successful in achieving its desired goals?	Did the program meet the expected goals? Is there an opportunity for stakeholders to offer feedback/recommendations for continuous improvement?	Was the program effective in achieving its desired goals for the participants? Is there an opportunity to enhance the experience of participants to broaden participation of historically underserved and underrepresented groups?	Did the program participants experience the intended outcomes from the program? Is there an opportunity for program participants to offer recommendations for improvement?
8. Refine & Revise & Maintain Determine how evaluation results will influence decisions for continuous program improvement. Reflect, incorporate feedback, and finalize design.	How will evaluation results be incorporated into decisions for continuous improvement? How will the program maintain its efforts once the revisions to the program design are complete?	How does the feedback from discussions with stakeholders inform changes to the program? Is the program ready to implement or are revisions needed?	Does the program connect to the intended audiences effectively?	How does the feedback from discussions with intended program participants inform changes to the program plan? Is the program ready to implement or are revisions needed?

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Phase 4: Program Implementation

6. Pilot	General Questions	Internal Stakeholders	Equity & Inclusion	Intended Program Participants
Implement the program as a pilot. Collect data aligned with program goals and objectives.	What do initial outcome data suggest about program success? What data from the pilot study connects to the program goals and objectives?	What additional resources or capacity is needed to fully implement the program?	Are the activities within the program reflective of the intended program participants?	What feedback do the program participants offer for improvement? Are any additional resources or capacity needed to fully implement the program?
9. Scale	**General Questions**	**Internal Stakeholders**	**Equity & Inclusion**	**Intended Program Participants**
Program can be scaled and replicated to new sites and can adapt to local conditions.	Does the program demonstrate that it is replicable and scalable?	Are all necessary program modifications, resources, and supports in place prior to scaling the program?	Are all necessary program modifications, resources, and supports in place prior to scaling the program to ensure program success and effectiveness within the intended audience?	What considerations, modifications, resources, or supports are needed to effectively scale the program to the intended audience?