

Problem-solving Model Overview: It is important for students to learn formal research models they can use for their school career and beyond.

AGOPPE Research Model (<i>Montgomery County Schools</i>)	BIG 6 (<i>Mike Eisenberg</i>)	CCSS ELA Research Model	DESIGN CYCLE (IB Schools) <i>Design Folder-Compilation of evidence for final solution</i>	DESIGN FLUENCY Model	5-A's Research Model (<i>Jukes</i>)	Information Search Process with Writing Process	INQUIRY PROCESS (<i>J Branch, D Oberg</i>)	I-SEARCH (<i>K. Macrorie; Joyce & Tallman</i>)	PACE	PATHWAYS to KNOWLEDGE (<i>Pappas & Tepe</i>)	Research Cycle (<i>Jamie McKenzie</i>)	SOLUTION FLUENCY (Global Digital Citizen)	WISER Research Model (<i>C. Klatt & S. South</i>)
ASK QUESTIONS Identify problem Brainstorm topic Background knowledge	1. Task Definition 1.1 Define the information problem 1.2 Identify information needed	Select a Topic or solve a problem Create focused questions Narrow or broaden inquiry when appropriate	INQUIRING & ANALYZING -Explain (the problem) & justify the need -Identify & prioritize the research -Analyze existing products -Develop a design brief (how intend to solve problem; guides investigation toward design specification)	ENGAGE	ASKING Key questions to be answered	Developing the task	ASK/PLAN Pose questions Identify topic of inquiry	SELECTING A TOPIC What do I want to know?	PLAN & PREPARE	PRESEARCH Develop an overview Connect to prior knowledge	QUESTIONING Start with an essential question then develop related questions to guide research	DEFINE	WONDER What do I know? What do I want to find out? Prior knowledge Acquire background information Create questions for investigation Create keywords
GATHER INFORMATION Brainstorm sources Identify keywords Skim for relevant information Record notes, bibliographic info	2. Information Seeking Strategies 2.1 Determine all possible sources 2.2 Select the best sources 3. Location and Access 3.1 Locate sources (intellectually and physically) 3.2 Find information within sources	-Gather relevant information from multiple authoritative print & digital sources, using advanced searches effectively -Assess credibility & accuracy of each source -Assess each source in answering research question, task, purpose and audience.	DEVELOPING IDEAS -Develop a design specification (detailed criteria of conditions, restrictions, dimensions with which design must comply) -Develop design ideas (generate range of feasible designs that meet design specification) -Present the chosen design (justify choice against design specification) -Develop planning drawings/diagrams (materials & methods)	EXPLORE	ACCESSING -relevant information	Choosing & locating sources Acquiring information	INVESTIGATE Find resources Select relevant & pertinent information	FINDING INFORMATION Where can I find the answers? USING INFORMATION How will I record the information that I find?	ACCESS & ACQUIRE Selecting sources & materials	SEARCH Identify & select resources Seek relevant information	PLANNING Identify likely sources of information & how to store findings GATHERING Collect information that relates to questions, that is relevant & pertinent	DISCOVER	INVESTIGATE What resources might help? Where do I find the resources? Find resources in different formats Record information using own words
ORGANIZE Analyze, interpret, evaluate, organize related to questions, create a graphic organizer to display relevant information PREPARE/ PRODUCE Create a rough draft, revise & edit for content & mechanics, publish	4. Use of Information 4.1 Engage (e.g., read, hear, view, touch) 4.2 Extract relevant information 5. Synthesis 5.1 Organize from multiple sources 5.2 Present the information	-Integrate information selectively while avoiding plagiarism -Quote or paraphrase following a standard format for citation Create Appropriate Form of Presentation -Provide bibliographic information for sources.	CREATING THE SOLUTION (<i>Begin Process Journal to include in Design Folder</i>) -Construct a logical plan (detailed, logical steps that describe efficient use of resources & time) -Demonstrate technical skills (document competent use of appropriate techniques & equipment (photo/video)) -Follow plan to make the solution -Justify changes made to the design while creating solution	EXPLAIN EXTEND	ANALYZING -information to turn it into knowledge APPLYING -the information to a task	Presenting results	CREATE Interpret & organize information Create product	DEVELOPING A FINAL PRODUCT How will I show what I learned?	COMBINE & CREATE Gathering & using resources	INTERPRETATION COMMUNICATION Apply information Share new knowledge	SORTING & SIFTING Sort & sift information into categories that contribute to understanding SYNTHESIZING Combine & rearrange information in search of patterns & clear picture to answer essential question	DREAM DESIGN	SORT/SEQUENCE/ SYNTHESIZE Organize main & supporting ideas Connect/compare ideas from various sources Use facts to build meaning Draw conclusions EXPRESS What is the best way to show the answer to my question? Express new knowledge & understanding Engage audience
PRESENT Present product to audience EVALUATE Evaluate final product based on rubric, reflect on research process	6. Evaluation 6.1 Judge the product (effectiveness) 6.2 Judge the process (efficiency)		EVALUATING -Design testing methods (generate data to measure success of solution based on target audience) -Evaluate the success of the solution (against design specification) -Explain how the solution could be improved (evaluate performance at each stage of Design Cycle) -Explain the impact of the solution (on target audience: life, society and/or environment)	EVALUATE	ASSESSING -the end result & product	Self-evaluation	REFLECT/ EVALUATE Product & process	How will I know I did a good job?	EVALUATE & EXPRESS Reflecting on process & product	EVALUATION Process & Product	EVALUATING Determine what might be missing; repeat earlier stages of cycle in search of better information REPORTING Report findings or recommendations	DELIVER Produce Publish DEBRIEF Reflection	REFLECT & CONNECT How does this connect to things I know? Do I have new questions? Am I proud of my work?