

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

CCSS ELA Research Model	Information Search Process with Writing Process	PECE	Inquiry Process (J Branch, D Oberg)	AGOPPE Research Model (Montgomery Country Schools)	5-As Research Model (Jukes)	WISER Research Model (C. Klatt & S. South)	PATHWAYS to KNOWLEDGE (Pappas & Tepe)	Research Cycle (Jamie McKenzie)	Big 6 (Mike Eisenberg)	I-Search (K. Macrorie; Joyce & Tallman)	IB DESIGN CYCLE Design Folder-Compilation of evidence for final solution, clearly divided into sections corresponding to Design Cycle
Select a Topic or solve a problem Create focused questions Narrow or broaden inquiry when appropriate	Developing the task	PLAN & PREPARE	ASK/PLAN Pose questions Identify topic of inquiry	ASK QUESTIONS Identify problem Brainstorm topic Background knowledge	ASKING Key questions to be answered	WONDER What do I know? What do I want to find out? Prior knowledge Acquire background information Create questions for investigation Create keywords	PRESEARCH Develop an overview Connect to prior knowledge	QUESTION Start with an essential question then develop related questions to guide research DEVELOP RESEARCH PLAN Identify likely sources of information & how to store findings	TASK DEFINITION Define the information problem Identify information needed INFORMATION SEEKING STRATEGIES Determine all possible sources Select the best sources	SELECTING A TOPIC What do I want to know?	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)
-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.	Choosing & locating sources Acquiring information	EXAMINE & EXTRACT Selecting sources & materials	INVESTIGATE Find resources Select relevant & pertinent information	GATHER INFORMATION Brainstorm sources Identify keywords Skim for relevant information Record notes, bibliographic info	ACCESSING -relevant information	INVESTIGATE What resources might help? Where do I find the resources? Find resources in different formats Record information using own words	SEARCH Identify & select resources Seek relevant information	GATHER INFORMATION Collect information that relates to questions, that is relevant & pertinent SORT & SIFT Sort & sift information into categories that contribute to understanding	LOCATION & ACCESS Locate sources (intellectually & physically) Find information within sources USE OF INFORMATION Engage (e.g. read, hear, view, touch) Extract relevant information	FINDING INFORMATION Where can I find the answers? USING INFORMATION How will I record the information that I find?	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)
-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.	Presenting results	COMBINE & CREATE Gathering & using resources	CREATE Interpret & organize information Create product	ORGANIZE INFORMATION Analyze, interpret notes Organize notes Create graphic organizer of relevant information PREPARE & PRODUCE Identify format for products Create rough draft, revise PRESENT	ANALYZING -information to turn it into knowledge APPLYING -the information to a task	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	INTERPRETATION COMMUNICATION Apply information Share new knowledge	SYNTHESIZE Arrange & rearrange information in search of patterns &/or clearer picture to answer essential question REPORT Report findings or recommendations	SYNTHESIS Organize from multiple sources Present the information	DEVELOPING A FINAL PRODUCT How will I show what I learned?	CREATING THE SOLUTION (Begin Process Journal to include in Design Folder) -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
	Self-evaluation	EVALUATE & EXPRESS Reflecting on process & product	REFLECT/EVALUATE Product & process	EVALUATE Evaluate product based on rubrics Write/reflect on process	ASSESSING -the end result & product	REFLECT & CONNECT How does this connect to things I know? Do I have new questions? Am I proud of my work?	EVALUATION Process & Product	EVALUATE Determine what information might be missing; repeat earlier stages of cycle in search of better information	EVALUATION Judge the product (effectiveness) Judge the process (efficiency)	How will I know I did a good job?	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)