

Okay, I've reviewed the prompt and the research report context you've provided. Here's a revised and improved AI prompt designed to be more effective in guiding the AI to create the desired textbook plan.

Improvements Made in the Revised Prompt:

- **Stronger Opening and Clearer Mission:** Starts with a more direct and engaging "mission" statement.
- **Emphasis on Research Integration:** Explicitly instructs the AI to use the provided research report to inform design choices, especially concerning gifted and neurodiverse learners.
- **More Granular Deliverables:** Breaks down deliverables into more specific and actionable points, making it clearer what the AI needs to generate in each section. For example, "Differentiation" is expanded into specific strategies like tiered activities, extension questions, etc.
- **Clarified PISA 2025 Optimization:** Provides concrete examples of how to optimize for PISA criteria, like using real-world scenarios and data analysis tasks.
- **LaTeX Focus Enhanced:** More explicit requests regarding the *types* of marginalia, visualizations, and equations to use within the Tufte LaTeX framework and *mhchem* package.
- **Accessibility and Neurodiversity Detail:** Expands on accessibility to include specific strategies for cognitive diversity, executive function, and varied learning styles beyond just "clarity and repetition."
- **Streamlined and Focused Language:** Removes some redundancy and uses more concise, action-oriented language throughout the prompt.
- **Stronger Emphasis on "Plan and Outline":** Reinforces that the AI is creating a *plan and outline*, not generating full textbook content.
- **Added "Research Report Integration" section:** Makes it explicit how the AI should use the provided research.

Here is the improved AI Prompt:

Improved AI Prompt to Generate NSW Curriculum-Aligned Science Textbook Plans for Gifted and Neurodiverse Students (V2)

Leveraging Research for Enhanced Textbook Design

Context: You have been provided with a research report titled “Best Practices in Science Textbook Design for Gifted Students.” This report analyzes studies focused on effective textbook design elements for science education, particularly for students with ADHD and Autism Spectrum Disorder, aligning with PISA 2025 frameworks and accessibility. **Your mission is to leverage the insights from this research report to develop comprehensive plans for two NSW Science textbooks (Stage 4 and Stage 5) that are specifically designed for gifted and neurodiverse learners.**

AI Prompt (Copy and Use):

Contextual Information and Role for AI:

You are a leading expert in educational design and curriculum development, specializing in creating highly effective and differentiated science textbooks. Your expertise lies in designing materials that cater to gifted, neurodiverse, and highly capable learners while strictly adhering to the NSW Science Curriculum for Stage 4 and 5. You are deeply knowledgeable about the Australian National Literacy and Numeracy Learning Progressions and the assessment framework of PISA 2025. **Crucially, you will use the provided research report, “Best Practices in Science Textbook Design for Gifted Students,” to inform your design decisions and incorporate evidence-based strategies throughout your textbook plans.**

Your Task:

Develop detailed instructions and a structured plan for **two distinct science textbooks:**

1. **Stage 4 NSW Science Curriculum Textbook:** *[Working Title Suggestion: “Unlocking Science: Explorations for Stage 4”]*
2. **Stage 5 NSW Science Curriculum Textbook:** *[Working Title Suggestion:*

“Advancing in Science: Pathways for Stage 5”]

Both textbook plans must comprehensively address the following key requirements:

- **Target Audience Focus:** Specifically designed to engage and support the unique strengths and learning needs of gifted, mentally diverse, neurodivergent, and highly capable students. Consider strategies highlighted in the provided research report for students with ADHD and Autism, and adapt them for a broader gifted and neurodiverse cohort.
- **Curriculum Alignment:** Strict and explicit alignment with the NSW Science Curriculum for the respective Stage (4 or 5).
- **Literacy and Numeracy Integration:** Explicitly integrate and articulate alignment with the Australian National Literacy and Numeracy Learning Progressions. Focus on building skills in:
 - **Numerical Literacy:** Data interpretation, graphing, mathematical reasoning in science.
 - **Scientific Literacy:** Scientific reporting, argumentation, understanding scientific texts.
- **PISA 2025 Optimization:** Strategically optimize content and activities to prepare students for PISA 2025 assessment criteria, focusing on:
 - **Scientific Literacy:** Understanding scientific concepts and processes.
 - **Numerical Reasoning:** Applying mathematical skills to scientific contexts.
 - **Analytical Thinking:** Interpreting data, drawing conclusions, evaluating evidence.
 - **Scientific Inquiry:** Designing investigations, analyzing results, formulating explanations.
 - **Collaboration and Communication:** Working in teams, presenting scientific information.
- **Pedagogical Rigor and Differentiation:** Employ pedagogically sound approaches including:
 - **Inquiry-Based Learning:** Structured investigations and open-ended explorations.
 - **Differentiated Instruction:** Tiered activities, extension tasks, flexible grouping.

- **Interleaving:** Mixing numerical and scientific concepts for deeper understanding.
- **Scaffolding:** Providing structured support for complex tasks, especially scientific report writing.
- **Higher-Order Thinking:** Critical analysis, problem-solving, creative application of scientific knowledge.
- **LaTeX Implementation (Tufte and mhchem):** Plan for the systematic use of:
 - **Tufte LaTeX Template:** Minimalist design, elegant typography, rich marginalia, side notes, and seamless integration of text and visuals.
 - **mhchem Package:** For clear and visually appealing chemical equations and formulas throughout the textbooks.
- **Accessibility and Neurodiversity Support:** Embed strategies to enhance accessibility and support diverse cognitive profiles, executive function, and learning styles, including:
 - **Clarity and Structure:** Well-organized content, clear headings, and consistent formatting.
 - **Repetition and Reinforcement:** Spiral curriculum design, revisiting key concepts.
 - **Incremental Conceptual Building:** Breaking down complex topics into manageable steps.
 - **Extension and Enrichment:** Challenging activities and resources for advanced learners (via side notes, marginalia).
 - **Authentic Inquiry Contexts:** Real-world examples and investigations to increase engagement.

Deliverables Required in your AI-Generated Plan and Content Outline:

1. Detailed Textbook Structure:

- **Chapter Outline:** List chapters and sections, aligning with the NSW Curriculum syllabus for each Stage.
- **Chapter Descriptions:** Briefly describe the subtopics covered in each chapter.

2. Differentiation and Enrichment Directives:

- **Specific Strategies per Chapter:** Detail concrete differentiation strategies (e.g., tiered activities, choice boards, extension questions,

flexible grouping) for each chapter, explicitly noting how these cater to gifted and neurodiverse learners. *Reference the research report for effective strategies.*

- **Side-Note and Marginalia Plan:** Describe how side notes and marginalia will be used for extension, enrichment, and additional support.

3. Literacy and Numeracy Integration Plan:

- **Explicit Links to Progressions:** Clearly identify specific Australian National Literacy and Numeracy Learning Progressions addressed in each chapter.
- **Numeracy Skill Building:** Explain how chapters will systematically develop numeracy skills (data analysis, graphing, etc.).
- **Scientific Literacy Development:** Outline how chapters will foster scientific writing, reporting, and reading comprehension.

4. PISA 2025 Optimization Strategy:

- **PISA Alignment Techniques:** Detail specific techniques to optimize for PISA 2025 criteria in each chapter (e.g., real-world scenarios, data analysis tasks, argumentation prompts, collaborative projects).
- **Global Scientific Issues:** Indicate how relevant global scientific issues (sustainability, environment, health, ethics) will be integrated to align with PISA's focus on real-world relevance.

5. LaTeX Implementation Guide (Tufte & mhchem):

- **Tufte Template Usage:** Provide specific recommendations for using margin notes, sidenotes, full-width figures, diagrams, and tables within the Tufte LaTeX template to enhance visual appeal, readability, and information hierarchy.
- **mhchem Integration Plan:** Give examples of how the *mhchem* package will be used to present chemical equations, formulas, and reactions in a clear and professional manner throughout the textbook.

6. Accessibility and Neurodiversity Support Plan:

- **Cognitive Diversity Strategies:** Detail specific strategies for presenting complex material in a way that is manageable for diverse cognitive profiles (e.g., visual aids, graphic organizers, concept maps, varied presentation formats).
- **Executive Function Support:** Outline how the textbook will support

executive function skills (e.g., clear task breakdowns, checklists, advance organizers, consistent chapter structure).

- **Learning Style Variety:** Describe how the textbook will cater to varied learning styles (visual, auditory, kinesthetic) through diverse activity types and presentation methods.

7. Research Report Integration:

- **Explicitly Reference Research:** Indicate *specific findings from the provided research report* that are being incorporated into the textbook design and *cite relevant points* from the report where applicable within your plan. (e.g., “Following the recommendation in Ediyanto et al. (2020) regarding interactive e-texts, Chapter 3 will include interactive simulations...”)

AI Output Formatting Requirements:

Present your textbook plan and instructions clearly, using the following structure:

- **Title:** (e.g., “Stage 4 Science Textbook Plan: Unlocking Science”)
- **Overall Aims and Learning Outcomes for the Textbook**
- **Chapter Outline:**
 - **Chapter [Number]: [Chapter Title]**
 - Short description of chapter topics
 - Differentiation and Enrichment Strategies (with research citations where applicable)
 - Links to Australian National Literacy/Numeracy Learning Progressions
 - PISA 2025 Criteria Optimization Techniques
- **Instructional Design Recommendations for Textbook Authors:**
 - Pedagogical Principles for Gifted/Neurodiverse Learners (referencing research report)
 - Tufte LaTeX Template Implementation Guidelines
 - mhchem Package Recommendations and Examples
- **Accessibility and Neurodiversity Support Strategies Section**
- **Research Report Integration Summary** (briefly summarize how the

research report informed the plan)

- **(Optional) Example Lesson Template/Format** (to illustrate chapter structure and alignment)

Key Phrases for Improved AI Results:

- “Research-informed textbook design for gifted and neurodiverse learners”
- “Explicitly link NSW Science Curriculum Stage 4/5 with differentiation for neurodiversity”
- “Detailed Australian National Numeracy and Literacy Progressions integration (numerical and scientific literacy)”
- “Optimize for PISA 2025 Scientific Literacy, Numerical Reasoning, and Inquiry frameworks”
- “Systematic Tufte LaTeX template implementation with mhchem integration for equations”
- “Pedagogically sound differentiated side notes and marginalia for enrichment and support”
- “Scaffolded scientific tasks with explicit numeracy guidance and diverse representations”
- “Comprehensive provision of cognitively diverse and neurodivergent learner adaptations (executive function, learning styles)”
- “Authentic scientific inquiry and real-world contexts aligned with PISA”
- “Accessible and enrichment-appropriate textbook structure and design”
- “Cite specific findings from the provided research report ‘Best Practices in Science Textbook Design for Gifted Students’”