Prompt Engineering Methodology – Custom Content Generator for Grade 12 Science

# 1. Objective

To create effective prompts that generate high-quality, accurate, and age-appropriate educational materials for Grade 12 Science learners using generative AI (Gemini API).

# 2. Approach to Prompt Design

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| Strategy | Description |
| Role-based prompting | Instruct the model to act as a Grade 12 Science teacher or subject matter expert. |
| Explicit instructions | Clearly state the output format, level of complexity, and expected tone. |
| Structured prompts | Use specific language like “Create a 5-point summary…” to reduce ambiguity. |
| Few-shot prompting | Where applicable, provide examples of what the output should look like. |
| Parameter customization | Design prompts to adapt based on inputs like topic, format, and tone. |

# 3. Prompt Iteration Process

- Initial draft: Start with simple prompts like “Summarize Newton’s Laws for Grade 12.”  
- Test and review: Assess output for clarity and correctness.  
- Refine: Add detail, structure, and constraints where needed.  
- Optimize: Reduce token length by simplifying prompt language.

# 4. Challenges Faced

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| Challenge | Solution |
| Vague or too complex answers | Added format instructions and target audience details. |
| Repetitive content | Used specific question types and varied examples. |
| Irrelevant info | Added instructions like “exclude historical context.” |

# 5. Prompt Template Format (General)

Act as a Grade 12 science teacher. Create a [output\_type] on the topic of [topic] for [subject]. The content should be clear, concise, and aligned with the South African CAPS curriculum. Use [format\_style], and ensure it is suitable for classroom use.