**Assignment 2: Role-based & Chain-of-Thought Prompting**

**Objective:** Learn role-based and step-by-step reasoning prompts.

**Task:** Explain how photosynthesis works.

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| Prompt Type | Prompt | Model Output | Reflection |
| Role-Based Prompting | ‘You are a high school biology teacher. Explain photosynthesis to students in simple words.’ | Welcome to our biology class! Today, we're going to explore one of the most important processes on our planet: photosynthesis!  So, what is photosynthesis? Photosynthesis is the way plants, algae, and some bacteria make their own food from sunlight. Yes, you heard that right - they make their own food! | This style feels engaging and friendly, well-suited for beginners. It adapts tone and vocabulary to match the “high school teacher” role, making the explanation easy to follow. |
| Chain-of-Thoughts | ‘Explain photosynthesis step by step, reasoning each step clearly.’ | 1. Light capture – Chlorophyll in Photosystem II absorbs light, exciting electrons. 2. Water splitting – Water is broken into electrons, protons, and oxygen (O₂ released).  3. Energy conversion – Electrons flow through an electron transport chain, making ATP and NADPH.  4. Carbon fixation – The Calvin cycle uses ATP and NADPH to fix CO₂ into 3-carbon sugars (G3P).  5. Sugar formation – G3P is turned into glucose and other carbohydrates for energy and structure. | This style focuses on factual accuracy and logical order. It is more technical and concise, which works well for readers who already understand basic biology and need detailed process steps. |

**Observations**

1. Role-based prompting changes the *tone* and *word choice* to suit the assumed role, making it more relatable and tailored for the audience.
2. Step-by-step prompting emphasizes *logical reasoning* and *process clarity*, often producing more structured, sequential outputs.
3. Role-based is ideal for teaching beginners, while step-by-step is ideal for in-depth learning or technical explanations.
4. Using both together can balance engagement and detail.