

Introduction to Dynamic Modeling & Dynamic Modeling AI Prompts

Building a model for a simple problem – carefully describe what you want, for example (to Build->quantitative):

Build a model for monthly bank balance over three years. The account earns 0.1% interest per year. I start with \$1000 and deposit \$100 every month. I have \$150 in monthly expenses.

Asking for help to start building a model – perhaps with intangibles (to Discuss->seldom):

How could I approach building a model of <area of interest, e.g., happiness>?

Generate background knowledge (to Discuss->seldom):

Give me a bulleted list of concepts and relationships that I should include in my model.

(Include a brief description of what you're trying to do or put it in the problem statement.)

When you have background knowledge and need a problem statement (to Discuss->seldom):

Give me a two-sentence problem statement from the background knowledge.

Finding the key stocks (to Discuss->seldom):

Using only the background knowledge, identify the key stocks that led to...whatever you're modeling.

Or:

From the problem statement, identify the key stocks that led to...whatever you're modeling.

Help with the reference mode – after adding the identified key stocks to the background knowledge (to Discuss->seldom):

Describe the behavior over time of the key stocks in this problem.

Generating a dynamic hypothesis – after adding the identified key stocks to the background knowledge (to Build->qualitative):

Using only the background knowledge, create a dynamic hypothesis for this system, including only stocks and using no more than <N> stocks. (N is typically three, four, or five,)

Or:

Using only the background knowledge, create a dynamic hypothesis for this system, including only stocks and using only the key stocks.

Determine possible behavior modes of a CLD (to Discuss->seldom):

What behavior modes could we expect to see from this CLD?

Possible interventions to effect policy changes from a CLD – directly after behavior modes prompt (example – to Discuss->seldom):

How could I stabilize the oscillation swings?

Get a description of a CLD (to Discuss->seldon):

Describe this CLD [optional: in up to <N> paragraphs, where N is, for example, two].

Get a description of all the links in a CLD (to Discuss->seldon):

Give me a link-by-link description of this CLD.

Generate prompts to build the model – after adding the dynamic hypothesis description to the background knowledge (to Discuss->seldon – the prompts are given to Build->quantitative):

Using only the background knowledge, give me <N> steps that I can use to build a system dynamics model of the problem statement. Each step should add to the scope of the model and result in a running model. For each step, give me a two-sentence prompt I can give to an AI to build me that part of the model. (N is typically three or four.)

Prevent a stock from going negative (to Build->quantitative):

Prevent <stock> from going negative by <action on its outflow>.

(E.g., <action on its outflow> could be ...*by restricting food consumption when food supply gets low.*)

Create an aging chain – be specific, for example (to Build->quantitative):

Create a two-stock aging chain of students at a 4-year university, underclassmen and upperclassmen, in months over a 10-year period.

Create a normalized graphical function from an approximate formula (to Build->quantitative), for example (just replace quoted variable names for your own case):

Change the "food effect on death rate" to a graphical function normalized by "normal grass available". Make sure the scale and shape make sense as a dimensionless multiplier modifying "normal death rate". Do not change anything else in the model; only modify "food effect on death rate".

Identify formulation problems in your model (to Discuss->seldon – double check response):

Are there any formulation errors in this model?

Fix formulation problems in your model (to Build->quantitative – be ready with Undo):

Using only this model, fix any formulation errors.

Initialize your model in equilibrium, likely with constants (to Discuss->seldon):

How could I initialize this model in steady-state?

Analytically initialize your model in equilibrium (to Discuss->seldon):

Derive the steady-state initialization equations for the stocks, using only variables in the model and no constants.

Ask for parameter suggestions (to Discuss->seldon; helpful to include Problem Statement):

What might be a good parameter value (or range) for <parameter name>?

Ask for suggestions for sensitivity analysis (to Discuss->seldom):

What model parameters should I perform sensitivity analysis on and what would be good ranges to use for those parameters?

Ask for an explanation of sensitivity results – place comparative results of key variable into Behavioral Description (to Discuss->seldom):

Help me understand these sensitivity analysis results found by varying <variable> from <min> to <max>.

Find all generic structures in a model (to Discuss->seldom):

Identify all the best-practice formulations, also called molecules or generic flow templates, in this model.

Critique the model (to Discuss->seldom):

Give me a critique of my model where for each issue you generate a bullet point where that bullet point gives a short title of the problem. I want up to two sentences describing the issue and one sentence for describing why the issue is important. I want your critique to focus on the scope of the model, and its applicability to the problem statement. Raise any other important issues.

Feedback explanation of the model behavior – after pasting table of all stocks and flows into the behavior description (to Discuss->seldom):

Give me a feedback-based explanation for why <what you're trying to understand/problem>.

Explaining the model to your audience (to Discuss->seldom):

Provide an explanation of <your problem> for a <the audience, e.g., college environmental studies major, policymaker, etc.>.

Ask for policy suggestions – after pasting table of all stocks, all flows, and key converters into the behavior description (to Discuss->seldom):

Give me some ideas on how to prevent <what you want to prevent or make happen, e.g., overshoot and collapse>.

Finding other examples where a model structure could be applied (to Discuss->seldom – I also completed the Problem Statement and ran the model; this also identified other cases where the same behavior arises):

Are there other unrelated applications of this model structure?