7.0 MODEL DEVELOPMENT

(Updated Spring 2005)

A response dependent variable is truly related to a set of independent variables by a mathematical function
$y = f(x_1, x_2, x_3, \ldots, x_n : \theta_1, \theta_2, \ldots)$

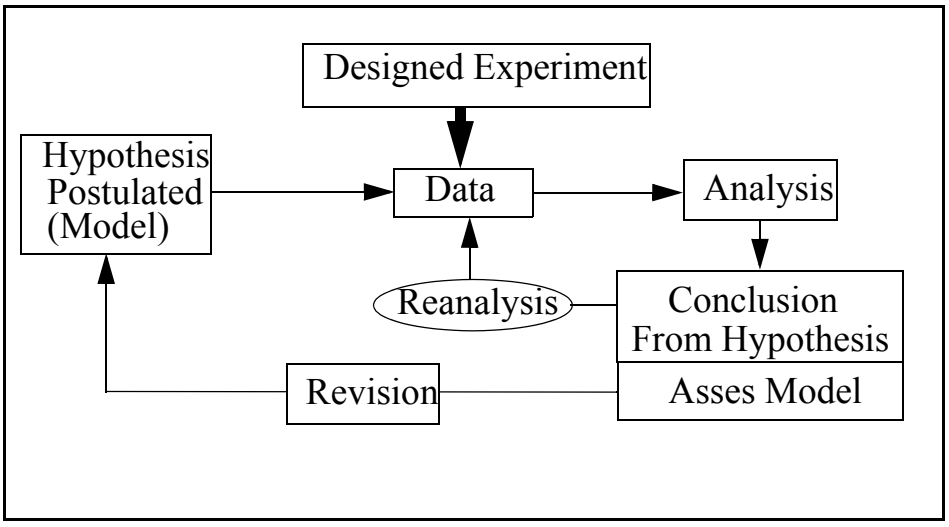
$x_1 \rightarrow x_n$ independent or input variables

$\theta_1, \theta_2 \ldots$ set of parameters.

• Rarely do we know much about the function, f
• Very often, we don't even know the important input variables.

Questions to answer
• Of all the variables we might consider which ones are important?
• How do the important variables affect the response?
• How can we find, or at least approximate, the true model f?
• What values of the input variables drive the response to a specified level, or optimize the response?

Sequential Approach to Experimentation



We will acquire knowledge about the phenomenon in an evolutionary fashion. Exercise caution. Don't just run one big experiment.

Rule of Thumb: Spend only 25% of effort/budget on the first design /experiment.
We are interested in designs which maximize the information content while minimizing the number of experiments.