

## **Can We Reformulate/Generalize “The Scientific Method”?**

**In “Inquiry-based Learning,” why aren’t we asking more questions?  
Is there a simplified, question-based formulation of “knowledge acquisition”?**

What can I observe? What do I observe?

What is observable directly without “help”?

What is observable with “help”?

Is what I observe changed by the “help”

Am I using the “help” in such a way that it is “helpful”?

What is observable indirectly (by inference or deduction)?

Are my observations:

accurately recorded?

honestly reported?

What can I learn from these observations?

What can I conclude based on observations?

What can I say that is consistent with my observations?

What can I conclude based on inferences from my observations?

How sure am I that I am right?

If I repeated or changed my method of observation, would it change what I:

observe?

infer?

conclude?

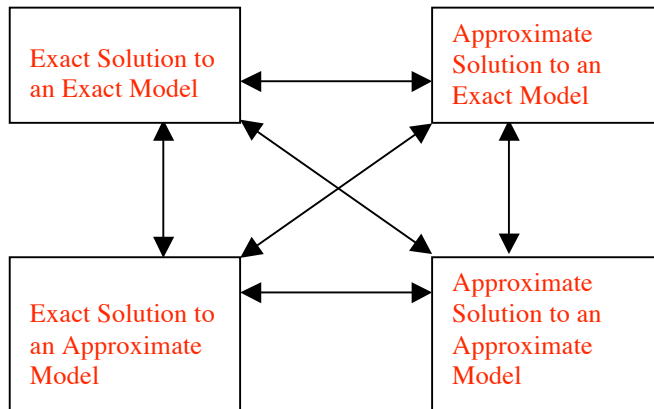
Is what I have observed consistent with what others have observed?

Is what I have inferred consistent with what others have inferred?

Is what I have concluded consistent with what others have concluded?

Why should I care?

## How Ought We to Evaluate the Model and Modeling Process?



upper left: what we want

lower left: the usual high school/undergraduate experience

upper right: idealized research

lower right: the real world

Is the model extensible?

What approximations were made to formulate the problem?

What approximations were made to implement the formulation?

How would one proceed to remove these approximations?

What would be the expected effect of these improvements?

Can the model be used as a sub-model for a larger system?