

Section 2: How to Study the Concept Development Studies

You should study each concept development study, not by memorization, but by carefully thinking about the experiments and the logical development of the concepts and models. Each study is short, and is meant to be read slowly and meticulously. Each sentence contains substance to be studied and understood. You should, at each step in the analysis, challenge yourself as to whether you can reproduce the reasoning leading to the next conclusion. One good way to do this is to outline the concept development study, making sure you understand how each piece of the argument contributes to the development of a concept or model.

It is very important to understand that scientific models and theories are almost never "proven," unlike mathematical theorems. Rather, they are logically developed and deduced to provide simple explanations of observed phenomenon. As such, you will discover many times in these concept development studies when a conclusion is not logically required by an observation and a line of reasoning. Instead, we may arrive at a model which is the simplest explanation of a set of observations, even if it is not the only one. Scientists most commonly abide by the principle of Occam's razor, one statement of which might be that the explanation which requires the least assumptions is the best one.

One very important way to challenge your understanding is to study in a group in which you take turns explaining the development of the model. The ability to explain a concept is a much stronger indicator of your understanding than the ability to solve a problem using the concept. Use the questions at the end of the concept development studies to practice your skill at explaining technical arguments clearly and concisely.

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