Hypothetico-Deduction is a type of reasoning commonly used in science based on a logical pattern which includes idea formation often using induction (See also) and subsequent testing with deductive means. Some suggest that this is *the* method of science.

Hypothetico-deduction (or hypothetico-deductive reasoning) is a dominant logical process within the sciences based on what Oldroyd (1986) has called the "arch of knowledge." Through induction (see also) evidence from observations and/or experiments is collected to the point where a scientist proposes a general-ization worthy of testing. The test takes the form of a predictive hypothesis (see also) which is then evaluated by using the process of deduction (see also).

As an example, consider the entomologist who has collected many examples of a new type of beetle from a particular tropical forest. She finds that the males of that species are reddish in color and the females are dark brown. This is the proposed generalization (or law) based on the available evidence and developed using inductive reasoning.

The question is whether or not this phenomenon is local or more widespread. So, offering the hypothesis that this pattern will be seen in other environments where these beetles are found, the scientist goes forth to collect specimens elsewhere. If, in other environments, the same pattern is seen, the scientist has support for the view that the pattern is related to the species not to the environment. If the pattern is not found in other environments, then the hypothesis is rejected and the conclusion is reached that the coloring on the males and females varies based on location.

It is important to note that since it would be impossible to survey all beetles in all locations, the acceptance of the hypothesis only gives support – not proof – to the original proposal. However, if beetles are found in some locations with color ratios that are different from those originally seen, it is possible to reject the proposed generalization. So, while it is not possible in science to prove that something is true, it is possible in science to demonstrate that something is false.

The classroom implications are clear. H/D reasoning is an important tool in science and students should be given opportunities to explore it. "The fact that science has at its core a general hypothetico-deductive research method suggests that a greater awareness of that method … would improve the quality … of science instruction" (Lawson, 2000, p. 492). Lawson also provides several useful examples of H/D reasoning for use in the science classroom including Harvey and blood flow, Loewi and nerve impulses, Lyells and the age of fossils, Young's work on the nature of light and atomic structure and Dalton. (WM)

Lawson, A. E. (2000). The generality of hypothetico-deductive reasoning: Making scientific thinking explicit. *American Biology Teacher, 62*(7), 482-495.
Oldroyd, D. R. (1986). *The arch of knowledge: An introductory study of the history of the philosophy and methodology of science.* New York, NY: Methuen.