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| ***Techniques for Documenting with Proof or Supporting Evidence, and Related Strategies for Problem Solving***  **By David Alderoty © 2016**  **Chapter 8) Technique-8, Inductive Reasoning, to Support your Writing and for Problem Solving**  [**This e-book presents 28 techniques for supporting the validity of the statements you write**](http://www.TechForText.com/DP/List)**.**  **Left click on the above for a list of the techniques**  **This chapter contains a little over 1,870 words**  **If you want to go to chapter 7, left click on the following link:**  [**www.TechForText.com/DP/chapter-7**](http://www.TechForText.com/DP/chapter-7)  **To contact the author use David@TechForText.com**  [**or left click for a website communication form**](http://www.david100.com/Mail)  **Table of Contents, and an Outline of this Chapter**  The following is a hyperlink table of contents, as well as an outline of this chapter. If you left click on a blue underlined heading, the corresponding topic or subtopic will appear on your computer screen. Alternatively, you can scroll down to access the material listed in the table of contents, because this chapter is on one long webpage.  [Topic 1.) Technique-8, Inductive Reasoning 4](#_Toc465160493)  [**Subtopic, The Conclusion in Inductive Reasoning** 4](#_Toc465160494)  [**Subtopic, The Premises Comprising the Evidence in Inductive Reasoning** 6](#_Toc465160495)  [Topic 2.) Inductive Reasoning Based on Incorrect or Irrational Premises, Week Evidence, or Emotional Factors 8](#_Toc465160496)  [**Subtopic, Questionable Assumptions, and Week Evidence, with Deductive Reasoning** 8](#_Toc465160497)  [**Subtopic, Premises Based on Emotional Factors, in Deductive Reasoning** 9](#_Toc465160498)  [Topic 3.) Simple Examples of Inductive Reasoning 10](#_Toc465160499)  [**Subtopic, Examples of Deductive Reasoning Involving sketches of Geometric Figures** 11](#_Toc465160500)  [Topic 4.) Inductive Reasoning and Writing, Followed by Additional and Supporting Material From Web-Based Sources 13](#_Toc465160501)  [**Web-Based Articles for Additional and Supporting Information for the Material Presented in this Topic** 14](#_Toc465160502)  [**Web-Based Videos for Additional and Supporting Information for the Material Presented in this Topic** 15](#_Toc465160503)  **This E-Book Provides Additional and Supporting Information from other Authors, with Web Links**  This e-book contains links to web-based articles and videos from other authors, for **additional, alternative, and supporting information.** The links are the blue underlined words, presented throughout this e-book. However, some of these links are to access different sections of this e-book, or material on my own websites.  Quotes and paraphrases in this e-book have hyperlinks to access the original source. The quotes are presented in brown text, which is the same color of these words. (The precise text color is RGB Decimal 165, 42, 42, or Hex #a52a2a)  Some of the web links in this e-book will probably fail eventually, because websites may be removed from the web, or placed on a new URL. If a link fails, use the blue underlined words as a search phrase, with [www.Google.com](http://www.google.com/) If the link is for a video, use [www.google.com/videohp](http://www.google.com/videohp) The search will usually bring up the original website, or one or more good alternatives. |

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| ***For those who prefer listening, as an alternative to reading, this book is recorded in an audio format.***  [***For an audio narration of this chapter, left click on these words (requires 14 minutes, and 48 seconds).***](P1.mp3) |

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| **Topic 1.) Technique-8, Inductive Reasoning**  |||  Inductive reasoning essentially involves evidence that leads to a conclusion, which is generally called a hypothesis. The evidence can be represented by one or more statements, or a set of premises. An example of a set of three premises is ***Mr. X’s fingerprints, blood, and DNA, were found in the crime scene***. This set represents evidence that leads to the conclusion that Mr. X was at the crime scene, and it also suggest the hypothesis that Mr. X carried out the crime.  Inductive reasoning is used by judges and juries to arrive at verdicts, and by scientists to devise hypotheses. However, with science the hypothesis is tested experimentally. An informal version of inductive reasoning is used in everyday life by most people. This can involve devising a set of expectations about an individual, based on previous experiences with the person.  Inductive reasoning may also be used in mathematics, coupled with experimentation. However, the ultimate objectives of mathematicians are to evaluate conclusions obtained by inductive reasoning and/or experimentation, with **deductive reasoning**.  **Subtopic, The Conclusion in Inductive Reasoning**  |||  In inductive reasoning the conclusion might be called one or more of the following:   * **A verdict, a hypothesis, an unproven theory, a prediction** * **A possible cause, or probable cause, of a phenomena, accident, or problem** * **A possible solution, or probable solution, or simply a solution to a problem**   The hypothesis or conclusion obtained with **inductive reasoning** is **not** thought of as a proof that is definitely correct beyond any doubt, as is the case with deductive reasoning. Depending on the strength of the evidence, the hypothesis may be thought of as possibly correct, probably correct, or correct beyond any reasonable doubt.  In some cases, the chances of a hypothesis being correct can be presented in percent. For example, based on the structure of a coin, I conclude with a 50% level of certainty, that if you toss a coin the outcome will be heads. The underlined words are the evidence, and the prediction of heads is the hypothesis, which has only a 50% chance of being correct with this example.  The validity of the hypothesis obtained with inductive reasoning can sometimes be confirmed or refuted with experimentation. This is often the case with science. Obviously, the verdicts from judges and juries usually cannot be confirmed the refuted by experimental evaluation.  Sometimes a hypothesis can be evaluated by trying something to see if it produces desirable results with a reasonable amount of time and effort. This is more or less a type of informal experimentation, which applies to many instances in everyday life. For example, the evidence and related hypothesis presented by an advertiser supporting the utility of a product can be evaluated by trying the product. Another example involves the observation of the qualities of an individual, which might result in a conclusion that he or she will be a good friend, mate, or employee. This can be evaluated by interacting with the individual over period of time to see if the hypothesis is correct.  **Subtopic, The Premises Comprising the Evidence in Inductive Reasoning**  |||  The premises comprising the evidence in inductive reasoning can involve one or more of the following:   * **Scientific techniques, including experimentation, evaluations, testing, and measurements** * **Observations which can range from casual** **sighting and experiences to scientifically controlled observations, involving instruments, such as microscopes, telescopes, seismographs, etc.** * **Measurements, can involve weight, mass, energy, length, width, height, volume, density, frequency, wavelength, velocity, acceleration etc.** * **Any type of recorded data, such as photographs, video, sound recordings, x-rays, cardiograms, electroencephalograms, sonograms, seismographs, and sonar imaging** * **Data obtained from any type of physical, biological, and chemical material, or a reaction of such material** * **Any type of anthropological, historical, political, psychological, and sociological data** * **Mathematical and statistical evaluations and measurements, which might involve evaluation of other types of evidence** * **Eyewitness reports** * **Any other type of evidence, including the** [**28 techniques**](http://www.techfortext.com/DP/List/) **listed in this e‑book** |

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| **Topic 2.) Inductive Reasoning Based on Incorrect or Irrational Premises, Week Evidence, or Emotional Factors**  |||  At a less scientific level, inductive reasoning might be based on assumptions that involve guesses, intuition**,** hearsay, superstitions, and observations that are of questionable validity. This of course can result in a conclusion that is incorrect, or irrational. **However, if some of the evidence is valid, a conclusion that is correct and perfectly valid might be obtained.** For example, if Mr. Y was convicted of murder, by a *racially prejudice jury*, who *thought he looked like a murderer*, and *talk like a murderer*, the verdict could be valid, if ***Mr. Y was arrested with the murder weapon, and his fingerprints, blood, and DNA, was found in the crime scene.*** The above example involves three irrational premises presented in red type. However, the guilty verdict is almost certainly correct, because of the four premises in bold type. This is **very different** from deductive reasoning, where one or more incorrect or irrational premises invalidate the conclusion.  **Subtopic, Questionable Assumptions, and Week Evidence, with Deductive Reasoning**  |||  Sometimes an inductive reasoning hypothesis is based on hearsay, intuition, questionable observations, or very weak evidence. However, this does not necessarily mean that the hypothesis is incorrect. Hypotheses in science, law, and in everyday life, often start out with weak evidence, or premises with questionable validity. However, because of ongoing study, research, testing, and/or investigation the evidence may indicate that a hypothesis is **correct beyond a reasonable doubt**, or is **probably correct**, or at the very least **possibly correct**. This can involve obtaining additional supporting evidence, refining and improving the available evidence, or confirming the validity of the hypothesis experimentally.  The ideas presented in the above paragraph, is very important for creative thinking, which involves the development of new concepts, theories, plans, structures, and inventions. The application of creative thinking often starts out with questionable, ideas, assumptions, and hypotheses. Some people might give up the creative thinking effort or even an entire project prematurely, without realizing that it may produce successful results with additional time and effort.  **Subtopic, Premises Based on Emotional Factors, in Deductive Reasoning**  |||  Deductive reasoning arguments based on emotional factors, are often presented in political campaigns, advertising, and various requests for funding. This may involve an attempt to persuade using an irrational emotional strategy. Some people exposed to the above, might buy a product that they do not need, or support a candidate that is counterproductive to their goals and lifestyle.  However, there are situations where premises based on emotional factors result in valid and functional, deductive reasoning conclusions for all concerned. This is illustrated with the following example.  If based on your observations, and conversations with Mr. Z, you **conclude** he likes football and he would appreciate tickets to a football game as a birthday present. With this example, the observations and conversations represent a set of premises that are ultimately based on emotional factors, which support the idea of buying football tickets for Mr. Z. |

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| **Topic 3.) Simple Examples of Inductive Reasoning**  |||  Inductive reasoning can involve collecting evidence that is based on a pattern, and how it varies in a sequence, with the objective of devising a hypothesis. With the above ideas, we can create good examples of inductive reasoning that are simple, such as the following:   * If the evidence is Octagon (has 8 sides)**,** Heptagon (has 7 sides)**,** Hexagon (has 6 sides)**,** Pentagon (has 5 sides)**,** Square (has 4 sides). Based on this evidence, determine what geometric figure should be at the end of the sequence. *The answer is a triangle, which obviously has three sides.* * If the evidence is the red digits, what is the value of X? 2, 4, 6, 8, X. The answer is X=10 * This example can be a little tricky. The evidence consists of the following sequence 1) square, 2) pentagon, 3) hexagon, 4) heptagon, 5) Octagon. Based on the evidence, what geometric figure would be perceived if the number was 100‑billion). The correct answer is a circle. This is because sides of the resulting geometric figure would be too small to be detected with the naked eye.   **Subtopic, Examples of Deductive Reasoning Involving sketches of Geometric Figures**  |||  The following are a similar to the previous examples, except they involve sketches of the geometric figures. Examine the evidence, which are the geometric figures framed in red. Then look at the questions, and then try to devise a hypothesis, that can be used to obtain the answers to the questions.  The evidence    You should have arrived at the following hypothesis: *The numbers on the left side of above diagram, equals the number of sides of the geometric figures.*  Based on this hypothesis, try to answer the following two questions. The **=** sign refers to the number of sides of a specific geometric figure.    The answer to the first question is an eight-sided figure called an **octagon. The** answer to the second question is a circle. |

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| **Topic 4.) Inductive Reasoning and Writing, Followed by Additional and Supporting Material From Web-Based Sources**  |||  Inductive reasoning is used in documents that contain arguments. This can involve inductive reasoning supporting a thesis, in an essay, term paper, or in a formal academic paper. This simply involves a set of premises, comprising the evidence that supports the thesis.  Various types of reports may have arguments based on inductive reasoning, such as accident reports, feasibility studies, grant proposals, etc. Reports of this nature, might contain a set of premises, (or evidence) that supports or refutes one or more of the following:   * **An explanation for the cause of a problem or accident** * **A possible solution to a problem** * **A recommendation for carrying out a project** * **A request for funding for a research or engineering project** * **A recommendation for an investment, or divestment** * **A plan for starting a business** * **A plan for an advertising campaign**   When writing reports, especially if they involve requests, it is probably best to place the most important evidence first, followed progressively by less important evidence. This is because the entire report may not be read.  However, the above does **not** apply to essays and formal academic papers that have a thesis based on inductive reasoning. The best way to arrange the evidence would depend on the specific nature of the essay or academic paper. However, it might involve presenting the evidence in the most logical order, in the most interesting sequence, or simply in chronological order.  **Web-Based Articles for Additional and Supporting Information for the Material Presented in this Topic**  |||  [Inductive vs. Deductive Writing](https://kuwcnews.wordpress.com/2015/02/25/inductive-vs-deductive-writing/)  [The Art of Argumentative Writing The Inductive Approach, By S.M. Zakir Hussain (Bangladesh)](http://www.author-me.com/nonfiction/artofinductivewriting.html)  [INDUCTIVE & DEDUCTIVE RESEARCH APPROACH, Meritorious Prof. Dr. S. M. Aqil Burney Director UBIT Chairman](http://www.drburney.net/INDUCTIVE%20&%20DEDUCTIVE%20RESEARCH%20APPROACH%2006032008.pdf)  [Inductive Reasoning vs. Inductive Reasoning](http://www.livescience.com/21569-deduction-vs-induction.html)  [DEFINITION inductive reasoning](http://whatis.techtarget.com/definition/inductive-reasoning)  [Georgetown University, Inductive Reasoning](http://changingminds.org/disciplines/argument/types_reasoning/induction.htm)  [Inductive Reasoning, Description, Discussion](http://changingminds.org/disciplines/argument/types_reasoning/induction.htm)  [Inductive Approach (Inductive Reasoning)](http://research-methodology.net/research-methodology/research-approach/inductive-approach-2/)  [Logical induction, by Scott Garrabrant, Tsvi](https://intelligence.org/2016/09/12/new-paper-logical-induction/)  [Inductive and Inductive: *Internet Encyclopedia of Philosophy*](http://www.iep.utm.edu/ded-ind/)  **Web-Based Videos for Additional and Supporting Information for the Material Presented in this Topic**  |||  [Inductive Reasoning Brightstorm](https://www.youtube.com/watch?v=ZTfVIMPV8KY)  [Induction and Scientific Reasoning, YouTube video](https://www.youtube.com/watch?v=w-bm-Cxg40E)  [How to Argue More Effectively Using Inductive Reasoning Scott Gold](https://www.youtube.com/watch?v=Typ8s-imCoc)  [Difference between inductive and inductive reasoning](https://www.youtube.com/watch?v=GEId0GonOZM)  [Inductive and Inductive Reasoning Tom Richey](https://www.youtube.com/watch?v=WAdpPABoTzE)  [Conditional statements and inductive reasoning](https://www.youtube.com/watch?v=Q5gk9ljVuTE)  [Deductive vs. Inductive reasoning organization of an essay](https://www.youtube.com/watch?v=J7brkjzU3Bg)  **If you want to go to chapter 9 of this e-book, left click on the following link:**  [**www.TechForText.com/DP/chapter-9**](http://www.TechForText.com/DP/chapter-9) |