## Competency: Analytical Thinking

**Definition:** The ability to approach a problem by using a logical, systematic, sequential approach.

**Behavioral Indicators:**
- Identifies causes
- Approaches problems by breaking them down
- Weighs priorities
- Recognizes actions and underlying issues

<table>
<thead>
<tr>
<th>Developing/Practicing this Competency</th>
<th>Learning from Others</th>
<th>Sample Developmental Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Research analytical thinking tools.</td>
<td>- Ask someone with</td>
<td>- By June 28, I will read</td>
</tr>
<tr>
<td>Apply one of the tools to a team</td>
<td>great analytical</td>
<td>*Analytical Writing and</td>
</tr>
<tr>
<td>project and get feedback from the</td>
<td>skills if you can</td>
<td><em>Thinking</em> by Linden, and</td>
</tr>
<tr>
<td>team.</td>
<td>work with them on</td>
<td>apply at least two ideas</td>
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<tr>
<td>- Organize a cross-functional team to</td>
<td>their next project.</td>
<td>described in that book to</td>
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<td>analyze and improve workflow of</td>
<td>- Ask someone skilled</td>
<td>a problem in my unit.</td>
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<tr>
<td>invoice payments.</td>
<td>in analytical</td>
<td>- By May 21, I will interview</td>
</tr>
<tr>
<td>- Use an analytical approach such as</td>
<td>thinking to provide</td>
<td>Lee Rodriguez about how he</td>
</tr>
<tr>
<td>project management to our next major</td>
<td>feedback on your</td>
<td>uses Microsoft Office</td>
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<td>project.</td>
<td>latest project.</td>
<td>Project software and get</td>
</tr>
<tr>
<td>- Read books and/or watch videos on</td>
<td>- Interview someone</td>
<td>a demonstration of this</td>
</tr>
<tr>
<td>analytical thinking (see below). Pick</td>
<td>who has developed</td>
<td>approach.</td>
</tr>
<tr>
<td>at least 1-2 ideas to try out.</td>
<td>and implemented an</td>
<td>- By August 20, I will</td>
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<tr>
<td></td>
<td>analytical process.</td>
<td>develop a detailed project</td>
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<tr>
<td></td>
<td>Find out what</td>
<td>plan for the succession</td>
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<tr>
<td></td>
<td>they did and what</td>
<td>planning project.</td>
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<td></td>
<td>was the impact.</td>
<td>- By September, I will</td>
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<td></td>
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<td>gather and analyze</td>
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<td>relevant information from</td>
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<td></td>
<td></td>
<td>staff, peers, and</td>
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<td>stakeholders on customer</td>
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<td></td>
<td></td>
<td>satisfaction on our</td>
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<tr>
<td></td>
<td></td>
<td>services. By October, I</td>
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<tr>
<td></td>
<td></td>
<td>will implement at least</td>
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<td></td>
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<td>one improvement.</td>
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</tbody>
</table>

*To Index*
Leadership Competency Development Guide for Analytical Thinking

This is not an exclusive list of resources. Please feel free to conduct your own search for more resources related to Analytical Thinking in civil service.

Resources Index

- Definition, Behavioral Indicators, Developmental Activities
- Academic Journals and Books on-line and available for checkout
- Videos and Podcasts on-line and available for checkout
- Courses on-line and for a fee
- Webinars
- Other Resources
Academic Journals and Books
On-Line and Available for Checkout

Academic Journals and Articles on Analytical Thinking

[California State Library]

Academic Journals and Articles

Books on Analytical Thinking

[California State Library]

Books Available for Checkout

Safari Books

See a book you are interested in reading? Check to see if the book is available for checkout at the [California State Library].

Books Available On-Line

Trouble accessing Safari?
Videos and Podcasts

Videos on Analytical Thinking

California State Library

Videos Available for Check Out

Podcasts on Analytical Thinking

iTunes University Free Downloads - Search for Analytical Thinking in Civil Service.
Courses On-Line And For a Fee

On-Line Courses for Analytical Thinking

Instructor-Led Courses for Analytical Thinking
Coming Soon!!
Other Resource Links

**Analyzing Ethical Problems/Decision Process** – Penn State College of Engineering

**Analyzing Performance Problems**

**Analytical Thinking** (PDF) – Dr. Ayman Amer, Cairo University

**Analytical Thinking Training** (PowerPoint)

**Analyzing Problems Tool Box** – The Community Tool Box

**Elements of Completed Staff Work**

**Evaluating Data** - Center for Education Integrating Science, Mathematics, and Computing - Georgia Tech

**Issue Paper Template**

**Problem Solving Techniques** – Mind Tools

**Questions to Inspiration Critical and Analytical Thinking**

**Seven Stages of Writing Assignments**: - Study Guides and Strategies

**Tips for Thinking Analytically**

**The Doctrine of Completed Staff Work**

**What is Completed Staff Work?**(PDF)

**Writing Tips** – Writing Anne Bliss, Ph.D., and the University of Colorado

- Analytical Thinking
- Analytical Thesis Statements
- Making Analytical Connections
- Transition Signals for Analysis
Linked Documents
<table>
<thead>
<tr>
<th>Book Title</th>
<th>Author</th>
<th>Publisher</th>
<th>Year</th>
<th>Call Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Don’t Believe Everything You Think: The 6 Basic Mistakes We Make in Thinking</td>
<td>Thomas Kida</td>
<td>Prometheus Books</td>
<td>2006</td>
<td>BF441.K45 2006</td>
</tr>
<tr>
<td>Reflective Thought, Critical Thinking</td>
<td>Samuel S. Shermis</td>
<td>ERIC Clearinghouse on Reading and Communication</td>
<td>1999</td>
<td>ED 1.30/2:436 007</td>
</tr>
<tr>
<td>Using Internet Primary Sources to Teach Critical Thinking Skills in the Sciences</td>
<td>Carolyn Johnson</td>
<td>Libraries Unlimited</td>
<td>2003</td>
<td>Q182.7.J65 2003</td>
</tr>
</tbody>
</table>
Academic Journals and Articles on Analytical Thinking

**Common Problems With Basic Problem Solving.**

The article discusses analytical problem solving through creative solutions, effective diagnosis and organizational awareness. It refers to one common issue wherein a problem is not defined as to what steps should be done to resolve it. It highlights the important step on diagnosing a problem which is the development of testable hypotheses. Moreover, analytical problem solving requires effective diagnosis, creative solutions, and organizational awareness of pitfalls to prevent recurrence.

**Author:** Okes, Duke  
**Source:** Quality 49, no. 9 (September 2010): 36-40.

**Creative Strategic Thinking And The Analytical Process: Critical Factors For Strategic Success**

This article looks at the interrelationship of analysis and creative thinking, which are two of the five factors previously identified as critical for strategic success. Shows how a deficiency of either factor can lead to defective strategies. Suggests that analysis is not always objective, and that it can be heavily influenced by behavioral considerations. Examines other issues in analysis and the role of techniques. [ABSTRACT FROM AUTHOR]

**Author:** Hussey, David  
**Source:** Strategic Change; Jun/Jul2001, Vol. 10 Issue 4, p201-213.

**Critical Thinking and Business Process Improvement.**

The paper explores a new perspective to convalescing Six Sigma and 5 Whys methods. It provides a specific example and suggestions to help practitioners avoid faulty conclusions, while conducting investigations to improve business processes. It also opens the door for encompassing aspects of CT in Six Sigma training. As such, it benefits both practitioners and academics. [ABSTRACT FROM AUTHOR]

**Author:** Ayad, Amine  
**Source:** Journal of Management Development; 2010, Vol. 29 Issue 6, p556-564

**Critical Thinking: A CRITICAL Strategy for Financial Executives.**
The article discusses the importance to executives and organizations of critical-thinking skills. Kathy Pearson of The Wharton School observes that such skills are particularly important for people making the transition from middle management to more senior positions. J.D. Schramm of the Stanford Graduate School of Business points out that the ability to think critically is a life-long skill, as opposed to knowledge of technologies that eventually become obsolete.

**Author:** Schott Karr, Susan  
**Source:** Financial Executive; Dec2009, Vol. 25 Issue 10, p58-61

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**Defining Critical Thinking**

The article focuses on the concept of critical thinking for career and technical educators in the U.S. The author cited critical thinking based on literature in education, philosophy and psychology. It has defined the use of cognitive skills or strategies to increase the probability of a desirable outcome.

**Author:** Rudd, Rick D.  
**Source:** Techniques: Connecting Education & Careers, Oct2007, Vol. 82 Issue 7, p46-49.

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**Developing Creative and Critical Thinkers.**

The article discusses strategic thinking and its key components, critical thinking and creative thinking, as they apply to the United States military. Also discussed is the approach of the Army War College to teaching these skills in its students. Adapting these decision making skills to the hierarchical nature of the armed forces is also discussed.

**Author:** Allen, Charles D. and Gerras, Stephen J.  

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**In the Company of Critical Thinkers.**

Based on 20 years of high school teaching experience, the author asserts that study groups can promote critical thinking and deeper learning among high school students. It is suggested that the reason study groups work so well is that they are inherently engaging. Furthermore, students whose teachers incorporate collaborative learning or study groups into the classroom will have more opportunities to think reflectively as they apply new knowledge. The author determines that, in order to engage students in critical thinking, they must be allowed the freedom and opportunity to get involved in socially constructed, ongoing processes that
require the use and application of knowledge. Several possible focuses for study groups are recommended and explored based on the author's research.

**Author:** Lent, ReLeah  
**Source:** Educational Leadership, Oct2006, Vol. 64 Issue 2, p68-72.

**Is Think Outside the Box 21st Century code for Imagination, Innovation, Creativity, Critical Thinking, Intuition?**

It is the authors' contention that there is no such thing as "thinking outside the box." However, the term has become an iconic phrase for a generation. The discussion presents the authors' thoughts on why there is no box in which to think outside. If there is a box, then accidental learning would never exist for students. [ABSTRACT FROM AUTHOR]

**Author:** Notar, Charles E. and Padgett, Sharon  

**Promoting Critical-Thinking Skills By Using Negotiation Exercises.**

Many writers argue that it is necessary to develop critical thinking skills in business students because these skills are needed to deal with the increasing complexities of real-life problems. Although the goal appears to be laudable, it is not always clear how to go about achieving it. In this article, the authors describe active learning experiences in a course on business negotiations that serve the dual purpose of teaching students to negotiate and sharpen their critical-thinking skills. In the current atmosphere of resource constraints, it is unlikely that separate courses can be set up for improving critical-thinking skills. A course on business negotiations, suitably designed to incorporate appropriate active-learning experiences, is one way to promote higher order thinking skills. [ABSTRACT FROM AUTHOR]

**Author:** Page, Diana, and Arup Mukherjee  
**Source:** Journal of Education for Business 82, no. 5 (May 2007): 251-257.

**Teaching Design Thinking Through Case Analysis: Joint Analytical Process**

The article focuses on teaching design thinking. It argues that as Association to Advance Collegiate Schools of Business (AACSB) asserts that higher-order thinking are crucial in business education, higher-order thinking is rather thin. It says that under design thinking, students are able
to think more freely on a managerial process plan to launch a well-informed idea. It also discusses a theory foundation for learning design thinking and teaching method called joint analytical process.

**Author:** Shouhong Wang and Hai Wang  
**Source:** Decision Sciences Journal of Innovative Education; Jan2011, Vol. 9 Issue 1, p113-118.
Books Available On-Line

**The AMA Guide to Management Development** by Daniel R. Tobin; Margaret S. Pettingell. AMACOM, 2008
Section 3 Critical and Analytical Thinking

**Analysis without Paralysis: 10 Tools to Make Better Strategic Decisions** by Babette E. Benoussan and Craig S. Fleisher. FT Press, 2008

**Disrupt: Think the Unthinkable to Spark Transformation in Your Business** by Luke Williams, FT Press, 2010

**Encourage Unconventional Thinking** by James F. Parker, FT Press, 2010

**Keeping Conflict Constructive: And Unleashing the Power of Divergent Thinking** by Michael A. Roberto, FT Press, 2010

**The Remedy: Bringing Lean Thinking Out of the Factory to Transform the Entire Organization** by Pascal Dennis. John Wiley & Sons, 2010

**What Disruptive Thinking Is, and Why You Should Be Doing It** by Luke Williams. FT Press, 2010

Trouble accessing Safari?

If you work at a state agency, and if you see screen below, click on START USING SAFARI under “Academic License & Public Library Users”

If you not on a State of California computer, you will need to enter your State Library card number and PIN in order to log-in to Safari. If you still can’t access Safari, please contact the State Library (916-654-0261). The California State Library is open Monday - Friday from 9:30 am - 4 pm.
<table>
<thead>
<tr>
<th>Video Title</th>
<th>Description</th>
<th>Format/Length</th>
<th>Year</th>
<th>Call Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galileo: The Challenge of Reason</td>
<td>In Galileo’s time there was no discipline of science. Then, science was regarded as the least important branch of philosophy that concerned observation rather than contemplation. This film is useful for promoting analytical and critical thinking.</td>
<td>VHS/26 Minutes</td>
<td>1970</td>
<td>QB36 G2 G35 1970</td>
</tr>
<tr>
<td>Looking at It from Every Angle</td>
<td>Explains the distinction between the process of solving problems and making decisions, and helps managers understand and master the steps involved in problem solving and decision-making.</td>
<td>VHS/32 Minutes</td>
<td>1985</td>
<td>HF 5549 15 L66 1985</td>
</tr>
<tr>
<td>Maps, Mindscapes and More</td>
<td>Demonstrates ‘mind mapping’, a unique form of graphic representation which enables learners to capture presentations and discussions in a form that clearly conveys the essential concepts and relationships.</td>
<td>VHS90 Minutes</td>
<td>1993</td>
<td>LB1601.5 M36 1993</td>
</tr>
<tr>
<td>Margaret Wheatley’s Lessons from the New Workplace</td>
<td>Participants will learn what it means to be part of a learning organization, the importance of the effective exchange and utilization of information, mapping organizational vision and values onto even simple tasks and more. By looking at diverse organizations, viewers will find many practical applications on how to analyze their own work roles in new and more productive ways.</td>
<td>VHS/24 Minutes</td>
<td>1995</td>
<td>HD58.8 M324 1995</td>
</tr>
</tbody>
</table>
On-Line Courses for a Fee on Analytical Thinking

**California Virtual Campus**

The California Virtual Campus is an online site to help individuals find long distance learning throughout California. Their course catalog helps individuals find online courses that are available at the various California Schools.

Phone Number: (530) 879-4085  
Website: [http://www.cvc.edu/](http://www.cvc.edu/)  
Online Contact: [http://www.cvc.edu/contact/](http://www.cvc.edu/contact/)

**OTech - Training & Event Center, HALO (High Achievement Learning Organization) “Office Desk Courses”**

HALO (High Achievement Learning Organization) delivers thousands of online courses and resources to your employees in a connected collaborative environment. With HALO, users can receive training and discuss best practices around specific content. OTech brings you HALO through the LearningPASS program, which offers other training services at deep discounts and no contracts.

Phone Number: (916) 464-7547  
Website: [http://www.dts.ca.gov/training/default.asp](http://www.dts.ca.gov/training/default.asp)  
Email: training@state.ca.gov
Instructor-Led Courses for a Fee on Analytical Thinking

**American River College**
American River College offers instructor-led and on-line classes that help people prepare for new careers and enhance with current job skills.
Phone Number: (916) 484-8011
Website: [http://www.arc.losrios.edu/](http://www.arc.losrios.edu/)
Online Contact: info@arc.losrios.edu

**College of Continuing Education, California State University Sacramento (CSUS)**
The College of Continuing Education at CSUS provides workshops, courses, training programs, and seminars to help adults enhance their careers and improve their job skills.
Phone Number: (916) 278-4433
Website: [http://www.cce.csus.edu](http://www.cce.csus.edu)
On-line contact: [http://www.cce.csus.edu/general_info/contactus.htm](http://www.cce.csus.edu/general_info/contactus.htm)

- Overview of Analytical Skills (1 day)
- Critical Thinking Skills, Sacramento State (2 days)
- Research Methods, Collecting Data, and Using Statistics (3 days)
- Effective Project Management for Analysts (2 days)
- Connecting the Dots within the Analysis Process (3 days)
- Controlling Chaos Within the Analysis Process (3 days)
- Innovative Analysis and Change (3 days)

**Centre For Organizational Effectiveness**
The Centre For Organizational Effectiveness provides academies and programs on management, organizational development, specialized leadership development, and training programs.
Phone Number: (858) 534-9119
Online Contact: [http://www.tcfoe.com/contact.html](http://www.tcfoe.com/contact.html)
Email: info@tcfoe.com

- Performance Management: Analyzing and Addressing Performance Issues (4 hours)
Cooperative Personnel Services (CPS)
CPS specializes in training public sector employees and meeting staff needs for each organization. CPS offers certificate programs to help employees advance in their careers.
Phone Number: (916) 263-3614 Option 3
Website: www.cps.ca.gov/training.aspx
Email: trainingcenter@cps.ca.gov

- Budget Change Proposal Overview (1 day)
- Budget Process Workshop (2 days)
- Business Writing (1 day)
- Communicating with Data (1 day)
- Cost-Benefit Analysis Workshop (1 day)
- Critical Thinking (Intro) (2 days)
- Franklin Covey's Project Management (1 day)
- Legislative Bill Analysis (2 days)
- Problem Solving and Decision Making (4 days)
- Productive Thinking Workshop (1 day)
- Program Analysis and Evaluation (3 days)
- Project Management (Intro) (3 days)
- Statistics I: Statistics for the Rest of Us (4 days)
- Statistics II: Statistics Refresher (2 days)

Folsom Lake College
Folsom Lake College has been developing Career Technology Programs that are designed to help individuals use real world skills and utilize those skills in the workplace.
Website: http://www.flc.losrios.edu/, Career Technology Programs
Phone Number: (916) 608-6687
Online Contact: http://www.flc.losrios.edu/Contact_Us.htm

- Introduction To Project Management (54 hours)
- Project Integration And Scope Management (54 hours)
- Project Time And Cost Management (54 hours)
- Project Risk Management And Project Procurement Management (54 hours)
Los Rios Community College District, Business and Economic Development Center (BEDC)

BEDC offers training at their worksite in Sacramento and at the employer's worksite. BEDC will customize training to meet the employer's needs.

Phone Number: (916) 563-3230
Website: [www.trainingsource.losrios.edu](http://www.trainingsource.losrios.edu)
Email: WinnerB@losrios.edu

- Essential Analytical Skills (1 day)
- Problem Solving (1 day)
- Completed Staff Work (2 days)
- Principles of Government Administration and Organization (1 day)
- Survey Research (1 day)
- Data Analysis and Interpretation (1 day)
- Budget Analysis (1-3 days)

OTech Training Center

The Office of Technology Services (OTech) Training & Event Center provides professional low-cost information systems, business professional development and management training to state, federal, and local government agencies.

Phone Number: (916) 739-7502
Website: [www.training.ca.gov](http://www.training.ca.gov)
Email: Training@state.ca.gov

- Three Modules/Problem Solving/Effective Communication/Intro to System Analysis (6 days)

State Personnel Board (SPB)

State Personnel Board offers training courses that range from Upward Mobility, to the Analyst Series Certification, Supervisory Training, Equal Opportunity Academy, and more.

Phone Number: (916) 653-2085
Website: [www.spb.ca.gov](http://www.spb.ca.gov)
Email: ttp@spb.ca.gov

- Essential Analytical Skills (1 day)
- Critical Thinking (1 day)
- Problem Solving (1 day)
- Principles of Government Administration and Organization (1 day)
Completed Staff Work:

The study of a problem and the presentation of a solution in such form that all that remains to be done on the part of the client is to indicate approval of the completed action. Completed staff work is the final result of a staff person’s most effective effort. It represents a combination of all knowledge, skill, and experience that can be brought to bear on a given problem. This concept exemplifies the way in which a staff person can contribute to the productivity of an organization.

Although not always required, the following is a complete list of elements that could be found in a completed staff work project:

**DEFINE THE ASSIGNMENT** — Make sure the scope of the assignment is clearly spelled out and confirmed by the assigner.

**PROBLEM DEFINITION** — Define the problem clearly. Briefly explain the background and history of the problem (if relevant).

**OBJECTIVES** — Establish the proposed state or goals to be achieved.

**LIMITATIONS** — List all specific limitations, restrictions, or constraints that will influence the problem and the proposed solutions. Examples: rules, laws, funds, manpower, decision-makers, etc.

**FACT FINDING** — Gather all pertinent information by consulting with all those who are involved or may be affected.

**ANALYSIS** — study and analyze the data. List and discuss the most significant facts and findings.

**ALTERNATIVES CONSIDERED** — Briefly list the alternative solutions actually considered.

**COST/BENEFIT ANALYSIS** — Determine the cost-benefit ratios of the alternatives considered and briefly explain why you rejected them.

**PROPOSED SOLUTION** — Explain the proposed solution and recommendation and the basis on which it is made.

**RECOMMENDATION** — Clearly state the recommendations for solving the problem.

**IMPLEMENTATION PLAN** — Prepare an action plan for implementing the proposed solution and for dealing with contingencies.

**IMPLEMENTATION DOCUMENTS** — Submit all necessary documents such as action letters, announcements, issue memos, etc., to implement action plan.
**FOLLOW-UP** — Submit the completed project.

**IMPLEMENT, CONTROL, ADJUST** — Implement, control and adjust problem solution.

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• **Issue Paper Template**

• Purpose of an Issue Paper
  The Issue Paper presents, usually in two to three pages, the definition, and discussion of a problem, question, or issue facing the organization. The writer presents the information so that all possible readers can easily understand the subject matter or situation.

• Instructions:
  All red italicized text is instructional – delete from the final document.
  1. Review this template with your assigner to ensure approval of format and sequence.
  2. Headings (words) are standard – usually not modified.
  3. Modify font and layout, if needed, as directed by your assigner.
**Ask Questions**

Here is a list of questions that can be used as a guide or as inspiration to get your critical and analytical thinking started. **Process**

**Acquire data**
- When to look
- How to ask
- Whom to ask

**Questions**
- Who might know more about this?
- Did I “Google” it?
- Did I check in with peers?
- Did I check in with my supervisor and/or people involved with the process?
- Did I perform an FTBNet2 search to see if there is a prior related project or documents?

**Organize Data**
- Absolute and relative comparison
- Statistical formats
- Reports formats

**Questions**
- Who is the audience?
- What data helps clarify the issue?
- What data is not relevant?
- What type of statistical or graphic display is best?

**Use Data to Reach Conclusion**
- Assessing needs
- Identifying problems
- Making decisions

**Questions**
- Did I think outside the box?
- Am I on the right track?
- Did I consider how the public or politicians might perceive this change?
- What could be done beyond the normal or traditional steps, processes, or procedures?

**Create Project Plans**
- Schedule activities
- Assign resources
- Monitor progress

**Questions**
- What kind of resources might be needed to implement this change?
- How much time and energy will it take?
- What resources are available?

**Change Management**
- Anticipate the change your effort will create
- Identify stakeholders
- Communicate early and often
- Involve people impacted by the change

**Questions**
- Who might be affected by the change?
- Did I consider both internal and external parties?
- What other procedures might be impacted by this change?
Tips for Thinking Analytically

1. Invest decision makers in the solution – they must own the problem.
3. Be open to new ideas.
4. Emphasize results over method.
5. Don’t confuse assumptions and opinions with facts.
6. Don’t take a stand on soft sand.
7. Do nothing and further study never solved anything.
8. Communicate with reason.
10. Don’t jump to conclusions.
11. Metaphors can clarify a point, but they can’t prove one.
12. Illustrate a point to clarify it.
13. When your work is finished, leave it as a legacy and stay out of the limelight.
14. Confidence in data comes at a price, so you never achieve absolute confidence.
15. Analysts make recommendations, not decisions.
16. Be willing to meet halfway on an issue.
17. Don’t personalize your work – keep emotion and criticism in perspective.
18. Keep an eye open at all times.