## TEACHING CRITICAL THINKING TO KINESTHETIC LEARNERS

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Summer
Institute
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#### WHO IS THE KINESTHETIC LEARNER?

http://psychsoma.co.za/.a/6a00d83420c4f053ef0162fe353a1c970d-pi

http://psychsoma.co.za/.a/6a00d83420c4f053ef015438b405f3970c-pi

https://media.licdn.com/mpr/mpr/shrink\_100\_100/p/3/000/0f4/187/0c1ee7e.jpghttps://learni ngfordummies.wikispaces.com/file/view/Neil%20Fleming\_0.PNG/355606240/240x216/Neil%20

http://www.petergeyer.com.au/images/briggs2.jpg http://www.centreforconfidence.co.uk/img/MB\_KB\_IBM.jpg







Isabel Briggs

Myers

Katharine-Briggs

**Myers Briggs** 

Alice Kolb David Kolb Experiential LSI



Learning Styles

ning
es

Neil Fleming & Colleen Mills
Sensory
VARK





Lois B. Krause Psychological or temperament Cognitive profile



http://www.clemson.edu/ces/eees/people/emeritus/krause.html Nilson, L. (2003). Teaching at its best. Bolton, MA: Anker Publishing; p.79

#### LEARNING STYLE TESTS

Kolb: Learning Style Inventory (LSI) \$35.00 at: http://www.haygroup.com/leadershipandtalentondemand/ourproducts/item\_details.aspx?itemid=118&type=2

Fleming and Mills: Visual, Aural, Read/Write, Kinesthetic (VARK) Free at: http://vark-learn.com/the-vark-questionnaire/ or \$7.95 at http://vark-learn.com/

Krause: Cognitive Profile Model, abbreviated Jungian model (2000) Free at: http://www.cognitiveprofile.com/cpionline Interpret results at http://www.cognitiveprofile.com/nf/study

Myers Briggs: Psychological test based on C. G. Jung \$49.95 at: http://www.mbtionline.com/

#### WHO IS THE KINESTHETIC LEARNER?

Paulina Pena in Belize 2013



John Robert Dinkins at Longwood Botanic Garden\_2014

Horticulture internships



Photo by Mahaffey

Growing plants

Learning Styles

Field trip to Musser Fruit Research Farm



Conference



Photo courtesy of Desmond Layne

**Photo by Ellen Vincent Application by Ellen Vincent** 

#### CRITICAL THINKING CONTENT ITEMS

- Definitions of Critical Thinking
- Justifications: Personal and global
- Complicated topics: Historical roots, contemporary interpretations for Socrates and Sustainability
- Teaching tools
  - Rubric
  - Group work (interdisciplinary, dialogue)
  - Demonstrations
  - Imagery: Power Points and essays
  - Essays: reflection
  - Syllabus

#### CRITICAL THINKING DEFINITIONS

- Use multiple definitions to reinforce "personal choice" and "largesse"
- Critical thinking happens when we think about how we think... we track our own thoughts and decision making processes (Vincent, 2013).

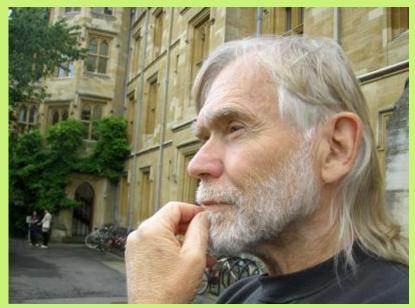




http://sandykumskov.com/images/think.jpg

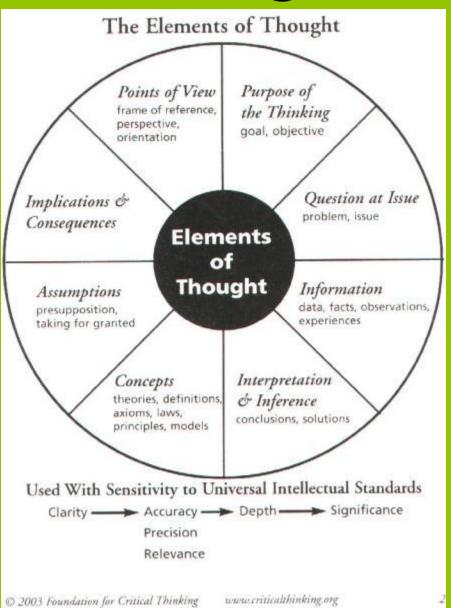
#### CRITICAL THINKING DEFINITIONS

Critical thinking...the awakening of the intellect to the study of itself (Scriven & Paul, 1987 from the Foundation for Critical Thinking Defining Critical Thinking at http://www.criticalthinking.org)



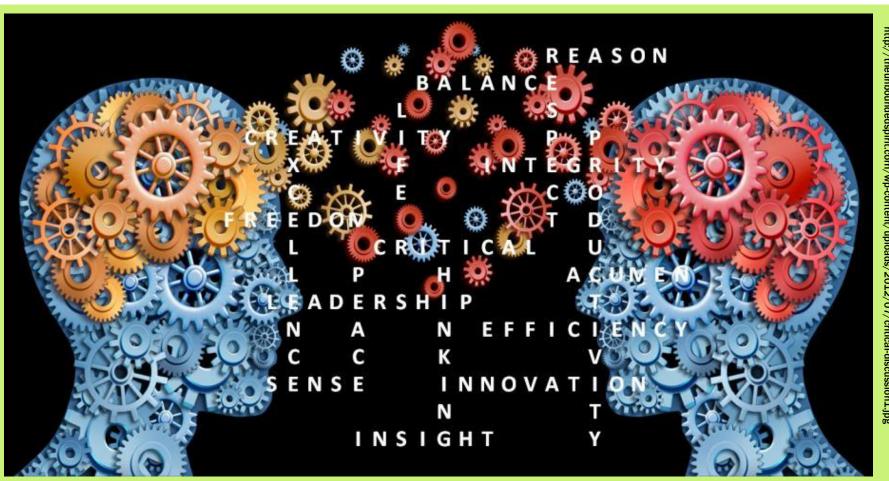
Richard Paul, Director of Research at Center for Critical Thinking

#### **Critical thinking definitions**



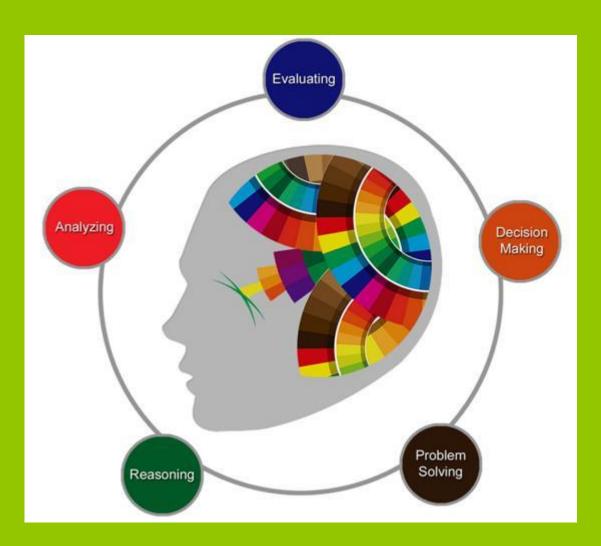
#### CRITICAL THINKING WHEEL

#### CRITICAL THINKING DEFINITIONS



http://theunboundedspirit.com/wp-content/uploads/2012/07/critical-discussion1.jpg

#### **Critical thinking definitions**



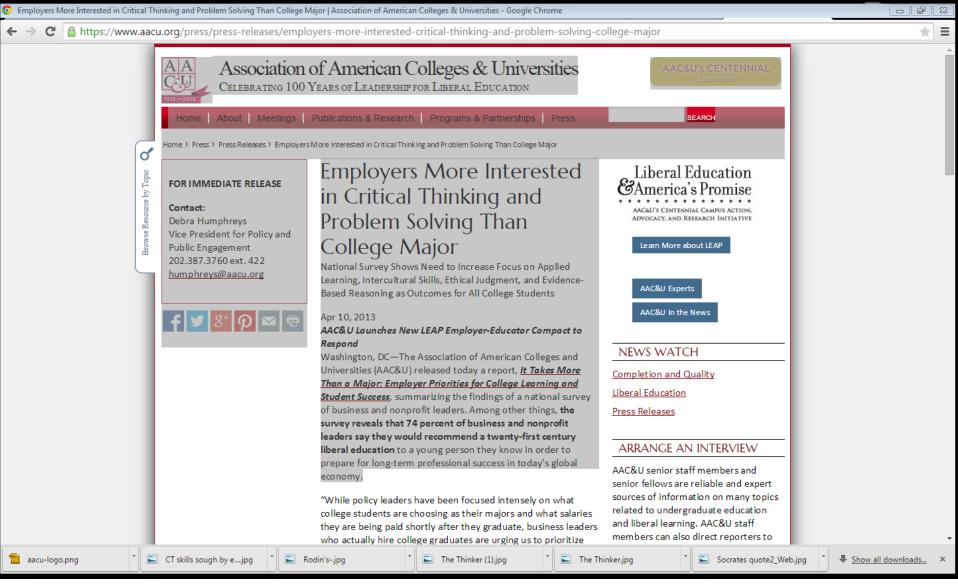
CRITICAL THINKING MODEL

http://www.umes.edu/cms300uploadedImages/Critical%20Thinking%20Image.jpg

#### JUSTIFICATION: PERSONAL



#### JUSTIFICATION: PERSONAL



## Insanity:

Doing the same thing over and over again and expecting different results.

Albert Einstein

#### **JUSTIFICATION: GLOBAL**

Critical Thinkers strive to improve the world in whatever ways they can and contribute to a more rational, civilized society. At the same time, they recognize the complexities often inherent in doing so. (Elder Biography)



Linda Elder, President Foundation for Critical Thinking

#### JUSTIFICATION: GLOBAL



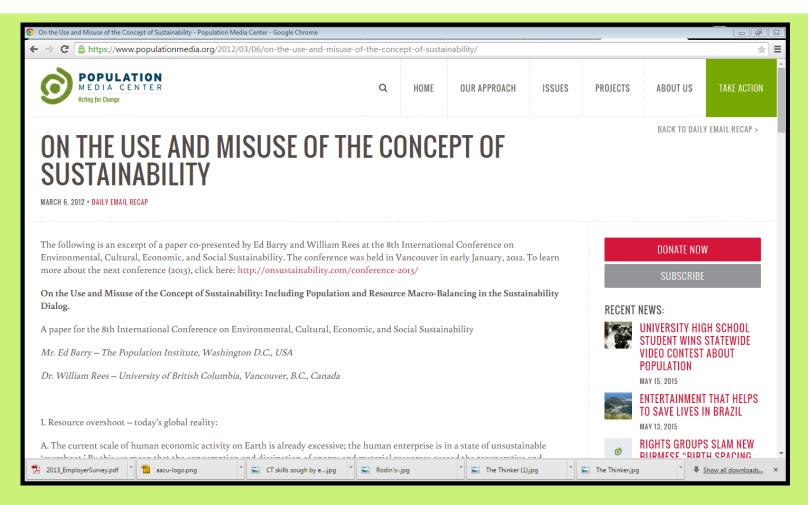
**Sustainable Landscape Demonstration Garden** 

Rain Garden Student Designinteracting with policy makers

## CELEBRATING COMPLICATED SUBJECTS: SOCRATES & SUSTAINABILITY

- Celebrate "messiness"
- Socrates is "an icon of popular culture who has inspired diverse associations and whose name has been appropriated for all manner of different purposes" (Stanford Encyclopedia of Philosophy at http://plato.stanford.edu/entries/socrates/)
- Sustainability "Its original meaning has been greatly distorted and extended; it has been misused and abused" (Karoly, K. 2011.)

## CELEBRATING COMPLICATED SUBJECTS: SUSTAINABILITY



## CELEBRATING COMPLICATED SUBJECTS: SUSTAINABILITY



## HISTORICAL ROOTS OF CRITICAL THINKING: SOCRATES (469-399 B.C.E.)

### Catch student attention with storytelling and discipline specific (horticulture) related items:

• He was ugly; he respected women; he spent lots of time outdoors talking and asking questions; he questioned authority and was sentenced to death for irreverence toward the gods; he died (cheerfully and willingly) by drinking hemlock (Conium)



Poison hemlock (Conium maculatum)

Sample illustrations:

←horticulture and arts→

Socrates by Constantin Brancusi. Socrates Digital Image © The Museum of Modern Art



#### HISTORICAL ROOTS: SOCRATIC METHOD

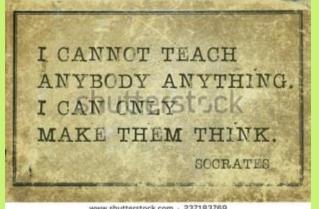
http://thumb7.shutterstock.com/display\_pic\_with\_logo/3426/237183769/stock-photo-i-cannot-teachanybody-anything-i-can-only-make-them-think-ancient-greek-philosopher-socrates-237183769.jpg

#### Relate subject to discipline specific items:

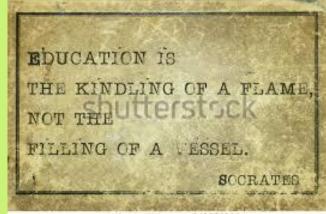
Socrates inspired the Scientific Method and development of hypothesis

#### Relate subject to CT relevant processes:

- Socrates always asked questions to determine logic, ethics, fairness, and constancy.
- A series of <u>questions</u> are posed to help a person or group to determine their underlying beliefs and the extent of their knowledge.
- The process was designed to force one to examine one's own beliefs and the validity of such beliefs.



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#### **CONTEMPORARY SOCRATIC TEACHING**



#### CONTEMPORARY SOCRATIC TEACHING

They embody the Socratic principle: The unexamined life is not worth living, because they realize that many unexamined lives together result in an uncritical, unjust, dangerous world. (Elder Biography)



Linda Elder, Author, Educational Psychologist

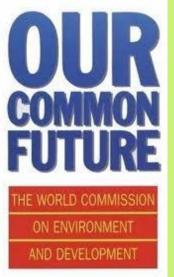
# nttp://www.google.com/imgres?imgurl=http://static.letsbi

## http://en.wikipedia.org/wiki/Gro\_Harlem\_

## HISTORICAL ROOTS: SUSTAINABILITY GRO HARLAN BRUNDTLAND (B. 1939)

- Norwegian Minister for Environmental Affairs (1974-1979)
- Prime Minister of Norway (Feb Oct 1981, May 1986-Oct 1989)
- Chair of United Nations World Commission on Environment and Development, published Our Common Future (April, 1987)
- Commission consisted or 22 members from 21 diverse countries (Borrowy, I. (2013) The Brundtland Commission: Sustainable Development as Health Issue, Michael 10: 196-206.)





#### HISTORICAL ROOTS: SUSTAINABILITY HISTORIC DEFINITION

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission, 1987, p. 8).



The World Commission on Environment and Development (1987). Our common future. Oxford: Oxford University Press.

#### CONTEMPORARY SUSTAINABILITY

#### THE SUSTAINABLE SITES INITIATIVE







- http://asla.org/
- http://www.wildflower.org/
- http://www.usbg.gov/

www.sustainablesites.org/

#### MODERN DEF. SUSTAINABILITY

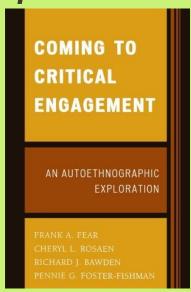
"Sustainability is defined as design, construction, operations, and maintenance practices that meet the needs of the present without compromising the ability of future generations to meet their own needs", (The Case for Sustainable Sites, 2009, p. 5).

Design **Sustainability Operations &** Construction Maintenance

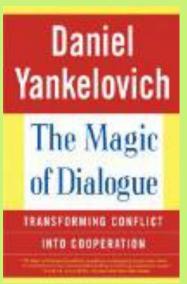
Sustainable Sites Initiative (2009). The case for sustainable landscapes.

#### **TEACHING TOOL: GROUP WORK**

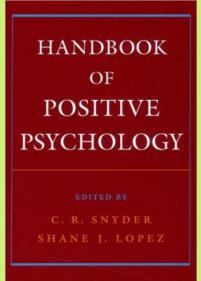
- Use interdisciplinary concepts and teams
- Identify "engagement" and practice "dialogue"
- Present positive psychology/appreciative inquiry concepts



Fear, Michigan State



Yankelovich, Harvard



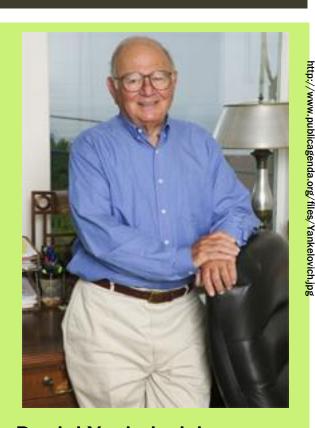
**Snyder and Lopez, University of Kansas** 

#### **TEACHING TOOL: DIALOGUE**

#### 3 Core components

- Equality
- Empathetic listening
- Airing assumptions and not judging them (or the speaker)





Daniel Yankelovich, business founder, professor, author

## TEACHING TOOL: INTERDISCIPLINARY TEAMS

Photo courtesy of Irish photographer

Interdisciplinary teams involve people from different and varied disciplines.

They agree to work as a team to create solutions for a specific issue/problem.



They are willing to learn from the other team members and change their mind about how to solve the issue/problem.

Dr. Frank Fear, Professor emeritus Michigan State

#### **TEACHING TOOL: GROUP WORK**

Form interdisciplinary teams by mixing majors



## TEACHING TOOL FOR GROUP EXERCISE: RUBRIC

#### Please form groups

- 1. Make a claim about engagement/dialogue.
- 2. Identify sources that you can use to validate your claim.
- State a possible point of view that agrees with your claim.
- 4. Explore a possible point of view that is contrary or does not agree with your claim.







## TEACHING TOOL FOR GROUP EXERCISE: WORKSHEETS

Provide clipboards and worksheets to professionalize the experience

See sample worksheets



#### **TEACHING TOOL: DEMONSTRATIONS**

Encourage hands on work: e.g. collect soil samples on site; send to lab for analysis; discuss results in class



Seeing, measuring erosion

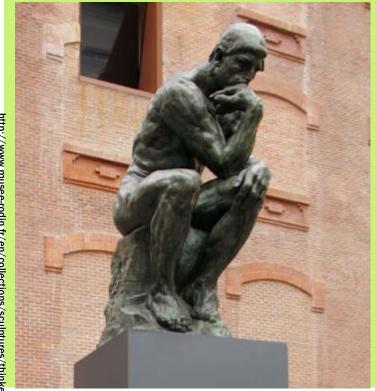


**Collecting soil samples** 

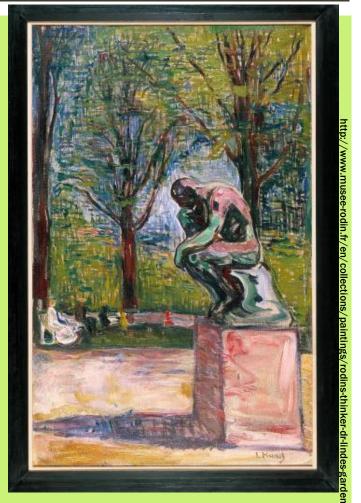
Photos by E. Vincen

#### **TEACHING TOOL: IMAGERY-POWERPOINTS**

#### Add discipline specific images to PowerPoints



The **Thinker** 1903 by Rodin (1840-1917)



Rodin's Thinker by Munch in Dr. Linde's **Garden** in Lubeck, circa 1907

#### **TEACHING TOOL: IMAGERY-WORD ART**



#### **TEACHING TOOL: IMAGERY-WORD ART**



#### **TEACHING TOOL: IMAGERY-ESSAY**

- Possible positive distraction
- Describes topic visually-possibly adding depth of understanding
- May be powerful personal history



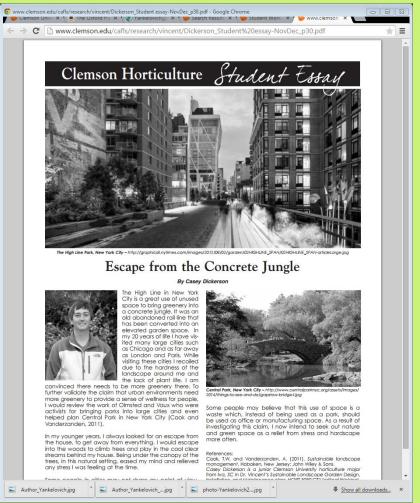


Photo by Michael Goodwin, HORT 308

**Photo by Austin Balzer, HORT 308** 

#### **TEACHING TOOL: IMAGERY-ESSAY**



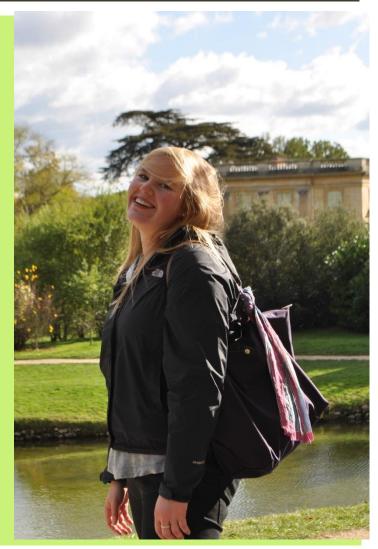


#### **TEACHING TOOL: ESSAY REFLECTION**

- Possibly binds new material to past personal experience
- Potentially creates a more "real" experience
- Encourages the habit of making connections, thinking deeply



See sample student essays and rubric



http://greenfield.blogs.brynmawr.edu/files/2013/04/DSC\_0482\_2.jpg

#### **Group exercise**

## WHAT IS INTELLECTUAL HUMILITY?

What does this look like in real life?

#### BERKELEY, CA



http://www.criticalthinking.org//

#### THANK YOU FOR BEING HERE



https://s-media-cache-ak0.pinimg.com/originals/98/95/d6/9895d6167d02d4824e50603f71734001.jpg

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Sustainable Landscape Demonstration Garden: http://www.clemson.edu/cafls/demo/Vincent research, pubs, presentations: http://www.clemson.edu/cafls/research/vincent/