

Concept Mapping

Faculty Development Workshop
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Aka: Mind Maps



**Two-dimensional, hierarchical node-link maps
(Mintzes, p. 67)**

What are the key features?

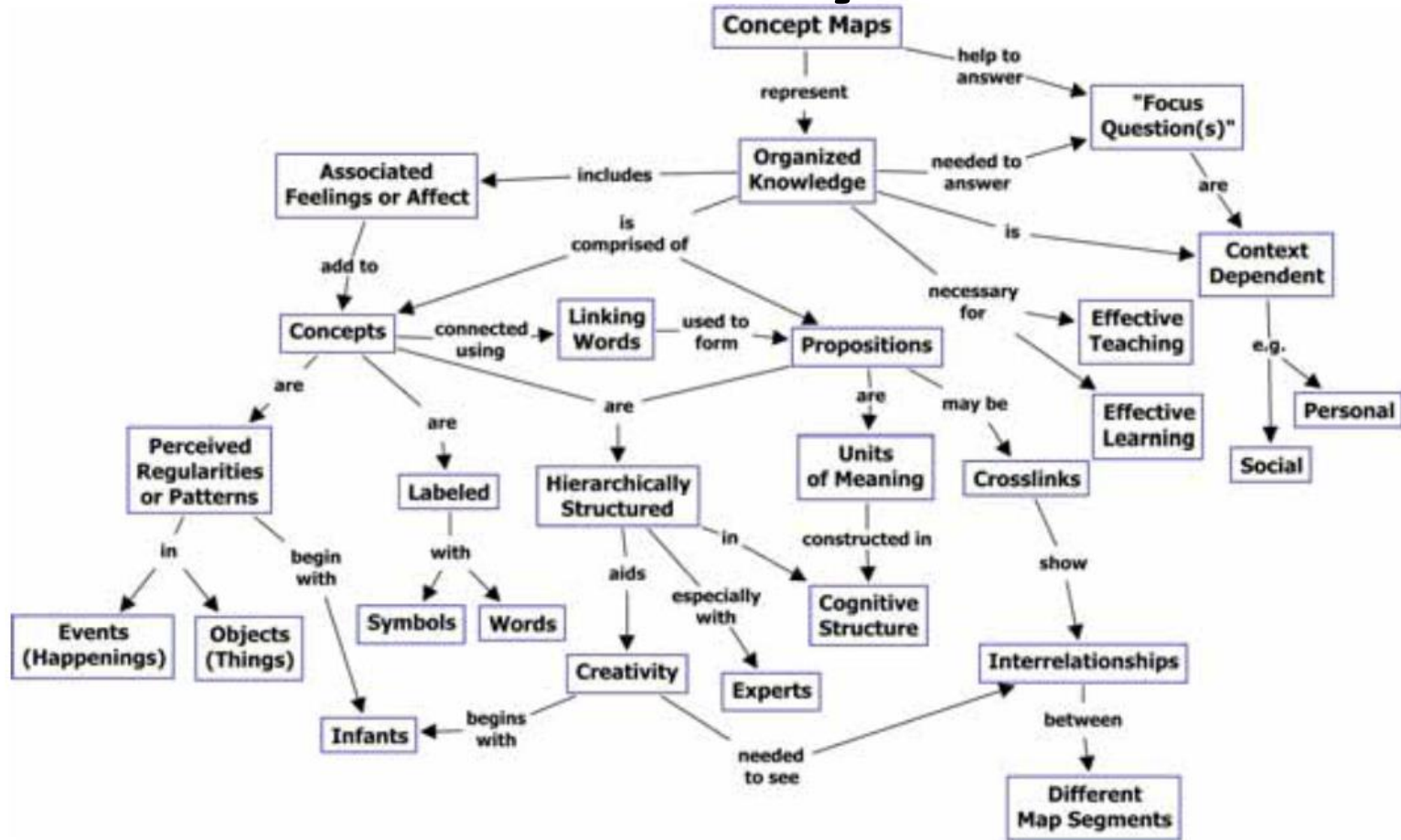


Figure 1. A concept map showing the key features of concept maps. Concept maps tend to be read progressing from the top downward.

Novak and Canas, The Theory Underlying Concept Maps and How to Construct and Use Them, Technical Report IHMC Cmap Tools 2006-01 Rev01-2008, Florida Institute for Human and Machine Cognition.

<http://cmap.ihmc.us/Publications/ResearchPapers/TheoryCmaps/TheoryUnderlyingConceptMaps.htm>

This is simplistic!

Why should I use up lecture time for this?!

- 1) To help students recognize the difference between meaningful, long-term learning and rote memorization.
- 2) To enable students to internalize information and then to communicate it in a meaningful way. Organize their thoughts.
- 3) Interact with the material.
- 4) Build connections between new and prior learning. Creative leaps in making connections.
- 5) Highlight relationships between compartmentalized topics.
- 6) Uncover misconceptions.
- 7) We remember images.
- 8) Emotional involvement in creation.

Brief History

David Ausubel: Cognitive psychology (1963; 1968; 1978)

Learning takes place by assimilating new concepts into an existing cognitive framework.

Concept maps were developed in 1972 by Joseph Novak at Cornell as a way to observe changes in science knowledge of children.

Implementation: You might have to explain what you want if you want a high-quality product!

For the instructor:

1. Review a topic.
2. Assign a focus question.
 - Notes, book chapter, journal article, video, lecture
 - Direct students to think about what they already now (prior learning)
3. Explain what a concept map is and why it might be a useful learning tool.

For the student:

1. Identify the major concepts (list).
2. Decide hierarchy (general categories to specific details).
3. Link and label connections.
4. Branch out: How much depth can you add?
5. Cross-link: How many of your concepts or details are related somehow? Link and label.

Implementation in the Lecture Hall

Think-Pair-Share (3 mental repetitions)

- 1) Introduce the topic and activity.
- 2) Students think for a few minutes and begin sketching their ideas.
- 3) Students pair and combine ideas into one map.
- 4) Students share ideas with class. Make a monster map on board.
- 5) Extension: Have students hand in maps and make a more thorough map including more of their ideas than you could in class. Post on Blackboard.
- 6) Extension: Do the activity again at the end of the semester or chapter (depending on your topic) to show them the difference between what they knew when they started and what they knew at the end of the unit/semester.

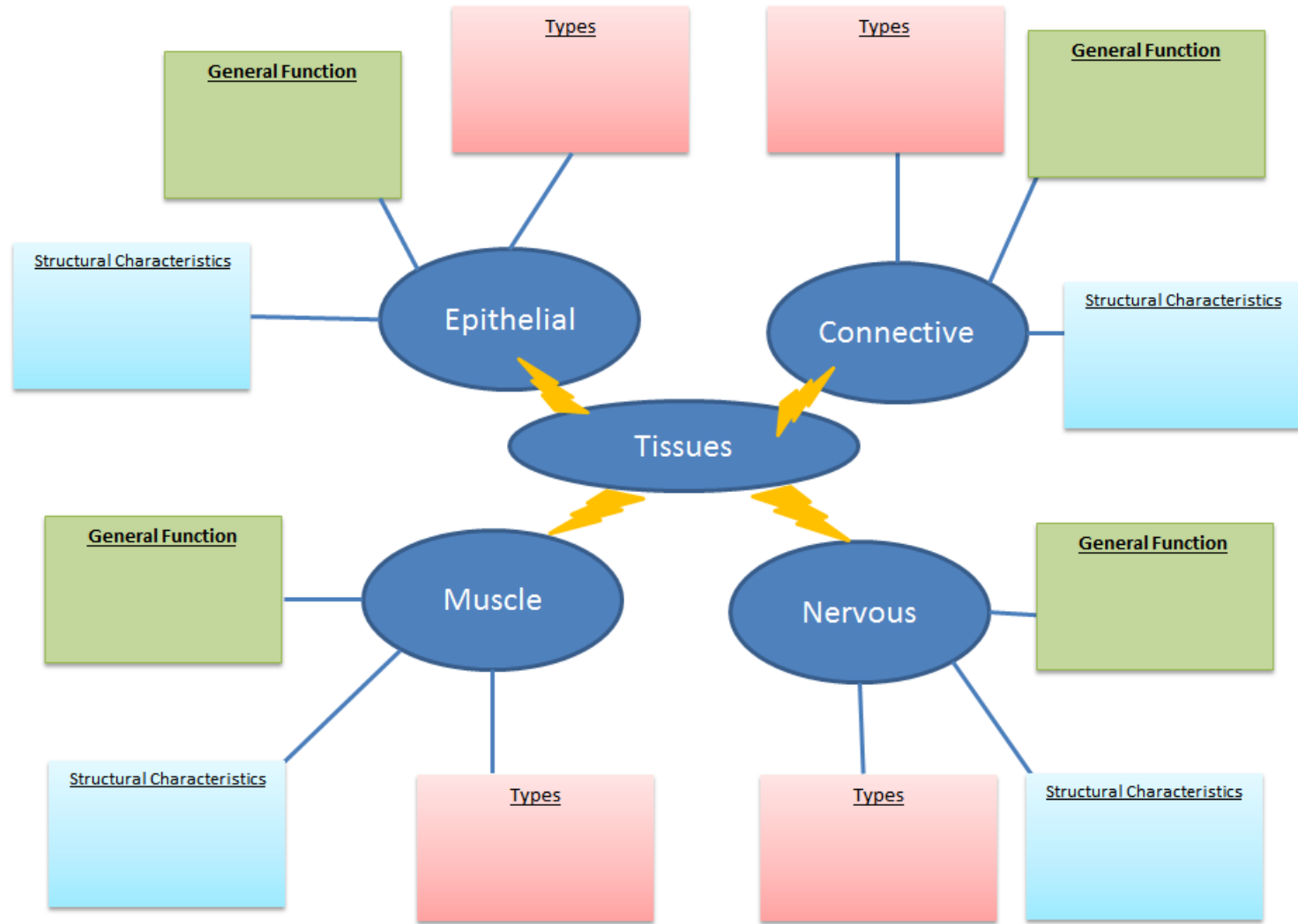
Class Effort Group Construction

Adaptations for Small Classes

- Large chart paper or flip charts
- Sticky notes nodes so they can be moved about the paper
- Larger groups
- Grading is more feasible

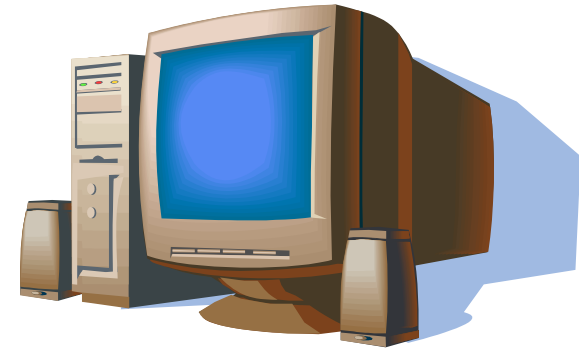


Fill-in Variation: Study or Review Sheets?



Software

Software maps can be created in groups asynchronously through Blackboard.



Freeware:

- Bubb.us (bubble concept maps)
- Gliffy Online
- Compendium
- *****CMAP: free; can integrate info (pictures, documents, etc.); tracks individual contributions

Low-tech solution:

- Post-it notes and chart paper

Your Task: DNA Concept Map

- 1) Discovery
- 2) Role in cell function
- 3) Replication
- 4) Relation to proteins



DNA - Concept Map

Using a concept mapping application, create a concept map on DNA. The concept map should include terms and concepts related to DNA, its discovery, how it controls the cell, how it makes copies of itself, enzymes and proteins related to DNA.

The concept map will be submitted as a digital file emailed to your instructor (or submitted via flash drive).

The assignment is rather large and will take some time to complete. Be prepared to spend time outside class to complete this project.

Concept Map Programs: [Cacoo](#) | [Gliffy](#) | [CMAP](#) | [Lucidchart](#)

Collaboration is possible with any of these programs if this assignment is to be completed as a group project.

Grading Rubric

| | Poor (2pt) | Satisfactory (3pts) | Good (4pts) | Excellent (5 pts) |
|--------------|--|---|---|--|
| Organization | Serious errors in organization, difficult to follow | Some lapses in organization that effect coherence and unity | Organization shows relations of terms, few lapses in organization but overall it is easy to read and understand | Well organized and logical in all areas, map is organized in such a way that concepts and links are easy to follow and understand |
| Ideas | Ideas are minimal, inappropriate or random | Ideas are somewhat random, minimal, or repetitious | shows well developed ideas (terms and concepts), enough to establish purpose of concept map | ideas are pertinent, extensive, establish purpose and show all elements of the topic |
| Connections | Concept map is mostly linear, with very few multiple connections to relate terms | concept map is mostly linear, but has some connections that link multiple ideas | concept map is presented as a web, terms are linked to multiple other terms | terms and concepts are linked in web form, showing multiple relationships between concepts and ideas |
| Knowledge | concept map shows very little overall knowledge of DNA and related terms | concept map shows some knowledge of DNA and related terms | concept map shows a solid knowledge of DNA, links show a fair understanding of how DNA was discovered, its structure and its function | concept map shows extensive knowledge of DNA - links show an excellent and comprehensive understanding of DNA and how it works to control life processes |
| Items | less than 10 concepts shown | 11-20 items shown | 21-30 items shown | 30 or more items on concept map |
| | | | | Total _____ out of 25 (x2) _____ out of 50 |

Image used with permission: <http://www.biologycorner.com/worksheets/DNA-conceptmap.html>; Visit the Biology Corner for other useful tools and materials: <http://www.biologycorner.com/>

Wrap-up Activity

1. Think of a topic in one of your classes where you could potentially implement concept mapping .
2. Sketch out a quick example.
3. Compare notes with a faculty member that teaches the same class you do. If one isn't available, pick someone who doesn't work in the office right next to yours!