

How to Create a Concept Map

Step-by-step instructions

1. Select a drawing medium.
 - pen and paper
 - whiteboard/chalkboard
 - online software
2. Create a main concept, or place the main concept you were given on your map.
 - This central idea connects to all other ideas on your map. Another way of saying this is that all of the other concepts on your map should work to explain, define, or provide an answer to your main concept/question.
 - If you're not sure where to begin, try identifying a portion of text, a classroom activity, or a tough problem that needs solving, or a focus question that clearly specifies the problem or issues the concept map will engage with and help resolve.
3. Identify key concepts.
 - Think about related ideas and list them.
 - Describe each concept as succinctly as possible; usually one or two words per idea will suffice.
4. Organize shapes and lines.
 - Order each of your concepts in a hierarchical format, with the most general ideas at the top of the list and the most specific ones at the bottom.
 - Place the concepts on the map in spatial relation to one another and to the main concept.
 - Draw lines to show concepts that are connected.
 - Write linking words on the lines to clearly define the relationships among general concepts and more specific ones.*
5. Fine-tune the map.
 - Reconsider the spatial representation of concepts and groups of concepts—Does it accurately represent hierarchical and parallel relationships?
 - Reconsider the linking words you've written on the lines—Do they accurately convey the relationships among linked concepts?
 - Redraw first draft?
 - Transfer handwritten draft to an online mapping program?

* Students may be able to list concepts related to the main concept, but still struggle with the nature of the relationships among the concepts, e.g., causal, supportive, illustrative, etc. Thus, writing linking words—though often challenging—is crucial to developing and demonstrating conceptual understanding.

Why use concept mapping?

Teaching for meaningful learning:

- Meet learners where they are
- Build onto and integrate with their existing knowledge
- Require higher-order thinking
- Orient teaching toward what learners perceive as relevant
- Help learners become self-directed

Benefits of Concept Maps

- Reveal learners' current understanding—gaps are visible
- Allow instructor to identify misconceptions and partial conceptions—"teach to the gaps"
- Require analysis and synthesis of concepts—higher order thinking (Bloom's taxonomy)
- Encourage learners to perceive knowledge gaps and become more self-directed
- If collaboratively created, enable a class to build a collective knowledge base
- Tap into underutilized learning modalities (visual, spatial)

Options for Concept Mapping

Pedagogical Purpose	Plan instruction/curriculum mapping Assess learners' prior knowledge Organize/review/study lecture notes Reinforce conceptualization of a process Review for exams Summarize, synthesize readings Organize for writing assignments
Mode/Medium	Online mapping program Drawing software Whiteboard/Chalkboard Sticky notes, butcher paper, pen/pencil
Class configuration	Whole class Small group Individual
Degree of autonomy	Blank/starting from scratch Partially completed
Location	In-class activity Homework assignment

Examples and Resources

1. Kerrie's Prezi slideshow on concept mapping
http://prezi.com/jumtk5kabvmu/?utm_campaign=share&utm_medium=copy
2. The Chalk Talk
http://www.nsrharmony.org/system/files/protocols/chalk_talk_0.pdf
3. Rubrics for concept maps
<http://teach.its.uiowa.edu/files/cft.uiowa.edu/files/Concept%20Map%20Rubrics.pdf>
4. Classroom Assessment Techniques—Concept Mapping
<http://archive.wceruw.org/cl1/flag/cat/conmap/conmap7.htm>
5. Using Concept Maps
<http://www.cmu.edu/teaching/assessment/assesslearning/conceptmaps.html>

Mapping software

1. Cmap Tools
<http://cmap.ihmc.us/>
2. Webspiration Pro
<http://www.webspirationpro.com/>
3. Bubbl.us
<https://bubbl.us/>
4. Prezi—presentation software that facilitates a more graphic, relational form of organizing
<https://www.prezi.com>
5. List of mapping software:
6. http://en.wikipedia.org/wiki/List_of_concept-_and_mind-mapping_software

Brief literature review

Ausubel, D.P. (1963). *The psychology of meaningful verbal learning*. New York: Grune and Stratton.

Haugwitz, M., Nesbit, J. & Sandmann, A. (2010). Cognitive Ability and the Instructional Efficacy of Collaborative Concept Mapping. *Learning and Individual Differences*, 20 (5), 536-543.
doi:10.1016/j.lindif.2010.04.004

Hay, D., Kinchin, I., & Lygo-Baker, S. (2008). Making learning visible: the role of concept mapping in higher education. *Studies in Higher Education*, 33(3), 295-311.

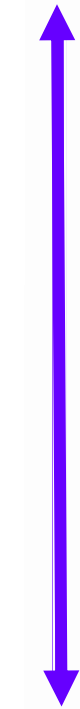
Novak, J.D., & Cañas, A. (2008). *The Theory Underlying Concept Maps and How to Construct and Use Them*. Technical Report IHMC CmapTools 2006-01 Rev 01-2008, Florida Institute for Human and Machine Cognition, 2008, available at:
<http://cmap.ihmc.us/Publications/ResearchPapers/TheoryUnderlyingConceptMaps.pdf>

Novak, J. D., & Cañas, A. J. (2015). YouTube interview series:

- The Origins of Concept Mapping: <https://youtu.be/mxlqanIzvUE>
- What Is Knowledge: https://youtu.be/TlxOrl_upi8
- What Is Meaningful Learning: <https://youtu.be/L8XTRS3VIKc>
- How to Introduce Students to Concept Mapping: <https://youtu.be/luldJ8daRLA>
- The Importance of the Focus Question: https://youtu.be/_PvPdVXazIM
- The Importance of Linking Words: https://youtu.be/Yvjn-NPA_Sc
- Misconceptions: <https://youtu.be/TKrSfPhcAZo>

Novak, J. D., & Gowin, D. B. (1984). *Learning how to learn*. New York: Cambridge University Press

General



Specific

