

Assignment Type: Concept Maps

What is it

A concept map is a visual organizer that can enrich students' understanding of a new concept. Concept maps are visual diagrams that outline the relationship between ideas and concepts. They include a 1) a focus question, 2) topics or concepts in boxes or circles, and 3) linking words to connect concepts. They usually include concepts enclosed in a circle or box, cross-linked to show relationships with other concepts. The cross-links include linking words or phrases to describe the relationship between the two concepts.

Most concept maps organize concepts in hierarchical order, with the most general or over-reaching concepts near the top, and more specific concepts subsumed near the bottom. This type of concept map is frequently used to organize knowledge by showing the relationship between concepts. However, there are many types of concept maps lending themselves to a variety of applications. They can include (closed-loop) feedback systems, continuum scales, flowcharts or process flow diagrams, and hierarchical tree diagrams.

Why use it

Concept maps help students organize new information by allowing them to make meaningful connections between main ideas and other information. They deepen understanding and comprehension. Concept maps have been used to communicate complex ideas, stimulate creativity, capture knowledge, and to increase meaningful deep learning.

Concept maps build on existing knowledge and allow students to explore relationships between ideas. Concept mapping is particularly suited for collaborative or cooperative learning activities.

How to use it

There are several ways to construct concept maps. Most include the following steps:

1. Model how to identify the major ideas or concepts presented in a selection of text as you read.

2. Organize the ideas into categories. Remind students that your organization may change as you continue to read and add more information.
3. Use lines or arrows on the map to represent how ideas are connected to one another, a particular category, and/or the main concept. Limit the amount of information on the map to avoid frustration.
4. After students have finished the map, encourage them to share and reflect on how they each made the connections between concepts.
5. Encourage students to use the concept map to summarize what was read.

Considerations

Concept maps are best when created by students rather than instructors. However, the instructor has several important roles, from defining the focus question, creating a collaborative learning environment, coach students as they rank concepts, and clarify the cross-links between concepts. The instructor should also determine how the student work will be used: as a learning tool, evaluation tool, or to diagnose misunderstandings.

Acknowledge that some students may feel uncomfortable with this type of assignment. Some may fear that their thought process are inadequate or that they have to be an artist to create a concept map. You may want to consider creating a narrated presentation on concept mapping and walk them through your expectations and the steps involved in creating a concept map. Also consider posting examples of concept maps to further assist students.

You may also want to consider having students first create a mind map to help them brainstorm their ideas and concepts prior to constructing the concept map.

Instruction and assessment

Providing clear instructions on how to create a concept map is essential. To create your concept map you are encouraged to follow these six steps modified from Davies (2011).

- The first step is to develop a focus question. The focus question has a declarative-type focus and is a question that clearly specifies the problem or issue the concept map should help to resolve.
- Second, brainstorm ideas and concepts related to this question. You may not use all your ideas, but spending quality time thinking about the relationship will make for a more engaging and effective concept map.
- Third, create a provisional map to use as a guideline for your final product. At this stage you will want to decide what type of relationship you want to use. You can use a hierarchical, systems, spider, or data driven approaches based on your creativity of how to best display the connection between the topics.

- Fourth, link the concepts from your brainstorming together to highlight this relationship. You enclose the concepts in circles or boxes, and provide the relationships between concepts with a connecting line
- Fifth, develop linking words and phrases to use with the created linkages. Some examples of linking words and phrases are will lead to, which is assumed, needed to see. Each line or group of lines should include a linking word and/or phrase.
- Finally, write a description of your map that describes the relationship you have depicted in the diagram.

There are many concept mapping programs available. Many programs offer a 30-day free trial, but others are free to download and utilize. In addition, many have tutorials built into the website to help you get started.

- [ClickCharts Diagram & Flowchart Software](#) and [Gliffy](#) are web-based products that include built in templates to help you get started.
- [Visual Understanding Environment](#) is a free open source software that you can download to your personal computer.
- Microsoft Office products have many templates for displaying relationships and processes, The SmartArt feature is built into the Insert tab within Microsoft Word and PowerPoint that you can use to create your concept map

Students may be apprehensive about using a software package to create their concept map. They can also create them by-hand and scan the image to submit for feedback and/or grading.

Please encourage students to start their concept maps early, since they may have questions as they start brainstorming and linking concepts together.

You may want to consider having students create concept maps on a topic and post to a discussion forum to generate dialogue on the similarities and differences between the maps.

Level of Bloom's Taxonomy: Sample Action Verbs

Assignments using concept maps are probably best constructed to work toward accomplishment of learning outcomes at the critical thinking cognitive levels. Here are a few examples of action verbs from the relevant levels of Bloom's cognitive domains:

- Applying: Construct, Illustrate, Investigate, Relate
- Analyzing: Analyze, Deduce, Distinguish, Prioritize, Summarize
- Evaluating: Determine, Explain, Interpret

- Creating: Design, Organize

Resources

- [Difference Between Concept and Mind Mapping](#)
 - This article explains and provides relevant examples of the differences between concept maps, mind maps, and argument maps. A table is provided to highlight the differences in purpose, structure, level of abstraction, nodes, linking devices, linking words, and language that is utilized to create the three types of mapping activities.
 - **Reference:** Davies, M. (2011). Concept mapping, mind mapping and argument mapping: what are the differences and do they matter? *Higher Education*, 62(3), 279-301. doi:10.1007/s10734-010-9387-6
- [Theory of Concept Maps](#)
 - This comprehensive document explains concept maps including their psychological foundations, epistemological foundations, constructing good concept maps, the CmapTools Software Toolkit, and models for various uses. The site contains numerous images and diagrams.
 - **Reference:** Novak, J. D. & Cañas, A. J. (2008). *The theory underlying concept maps and how to construct and use them*. Pensacola, FL: Institute for Human and Machine Cognition. Retrieved from <http://cmap.ihmc.us/docs/theory-of-concept-maps>
- [Benefits of Concept Maps](#)
 - This short article describes the benefits of using concept maps. The author provides advice on using concept maps in regards to structure, feedback, exam alignment, and learning styles and study habits.
 - **Reference:** Weimer, M. (2015, January 20). Keeping students on board with concept maps. *Faculty Focus*. Retrieved from <http://www.facultyfocus.com/articles/instructional-design/keeping-students-board-concept-maps/>