



Self-regulation:

Using Concept maps to make your learning meaningful

Concept maps have been used as a learning tool in a variety of educational setting and provide an opportunity to explore learners' knowledge structures and **promote critical thinking and understanding**.

Concept mapping is an **instructional strategy** for individual and group learning that involves **integration of knowledge and creation of meaning** by relating concepts.

Definitions

Concept map is a **graphic tool** for **organizing and representing knowledge**, were developed in 1972 in the course of **Joseph Novak's research** program at Cornell University and is based on **Ausubel's assimilation theory** of learning.

In this view, we think and learn with concepts **by linking new concepts to what we already know**. In addition, concepts are stored **hierarchically and differentiated** as learning grows.

Concept maps function in four main ways:

- (i) By promoting meaningful learning;
- (ii) By providing an additional resource for learning;
- (iii) By enabling instructors to provide feedback to students, and
- (iv) By conducting assessment of learning and performance.

Where do concept maps originate and how do they work?

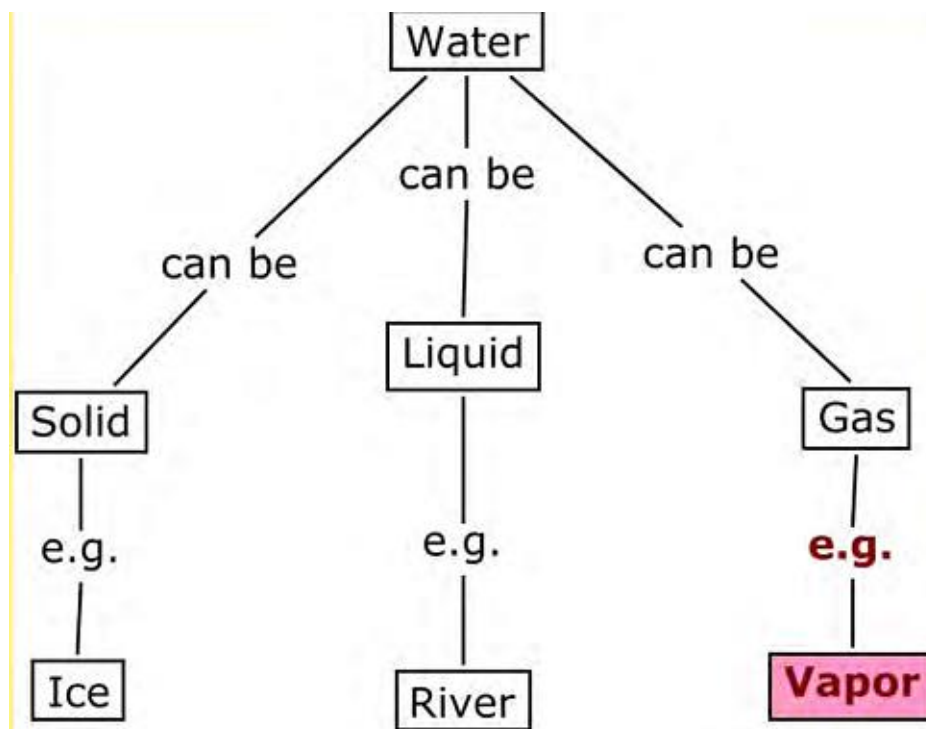
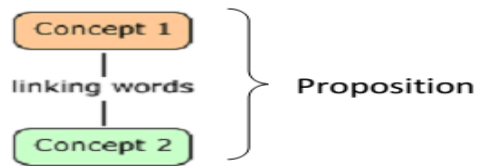
Concept maps have at their heart the theory that all knowledge is built from Concepts and Propositions. **Joseph Novak is widely credited** as the creator of concept maps, and has been writing and researching them since the 1970s.

A concept is perceived **regularity in events or objects**, or records of events or objects, designated by a label: for example, Life; Cell; Blue; Ship.

A proposition is made **when two or more concepts** combined to form **a statement** about something: a basic unit of meaning or expression: e.g., living things are composed of cells **OR** the ship was blue.

Thus, concept maps represent knowledge using diagrams that express concepts and propositions, and are therefore a tool to represent the structure of knowledge

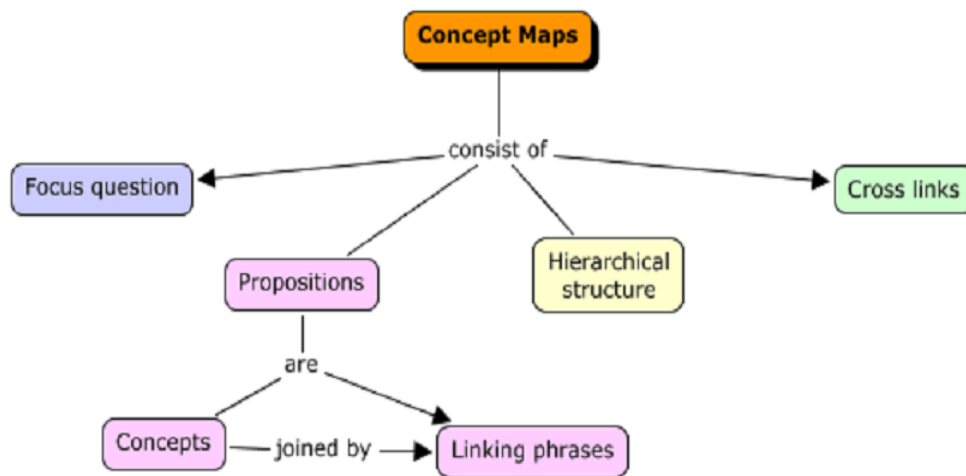
Figure 1 - A proposition, the basic unit of memory



Characteristics of concept maps

- **Focus question** - clearly specifies the problem or issue the concept map should help to resolve.
- **Propositions** - a concept map consists of a graphical representation of a set of propositions about a topic.
- **Hierarchical structure** - the most general concepts are at the top of the map and the more specific, less general concepts are arranged hierarchically below. Because of this, concept maps tend to be read from the top, progressing down towards the bottom. This is not a rule; it could be cyclic as long as there is logical order (e.g. using arrows or numbers).
- **Cross-Links** - relationships or links between concepts in different segments or domains of the concept map. Cross-links often represent new insights on the part of the knowledge producer.

Figure 2 - Components of concept maps



Constructing a Concept Map

There is no simple recipe or set of steps for constructing a concept map, everyone has their own style. Some start by listing a set of concepts, others go directly to placing a root concept and start linking other concepts from it.

Here is a suggested sequence:

To create a concept map, the learner engages in an active process that includes the following steps.

- **Firstly**, the learner identifies the most general concepts and places them at the top of the map.
- **Secondly**, the learner identifies more specific concepts that relate to the general concepts in some way.
- **Thirdly**, the learner ties together the general and specific concepts with linking words that make sense to him or her.
- **Finally**, the learner actively looks for cross-linkages that tie concepts from one side of the map to concepts on the other.

Concept maps can be created by hand with paper and pencil, or they can be created using one of many computer-based software programs, for example CMAPTools (see <http://cmap.ihmc.us/conceptmap.html>).

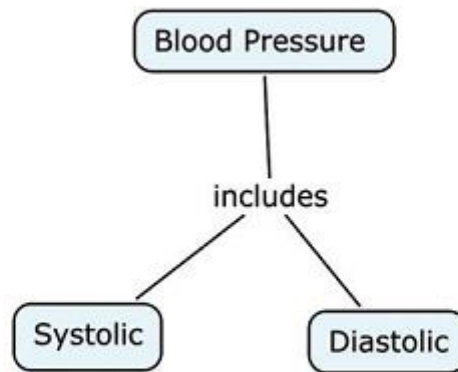
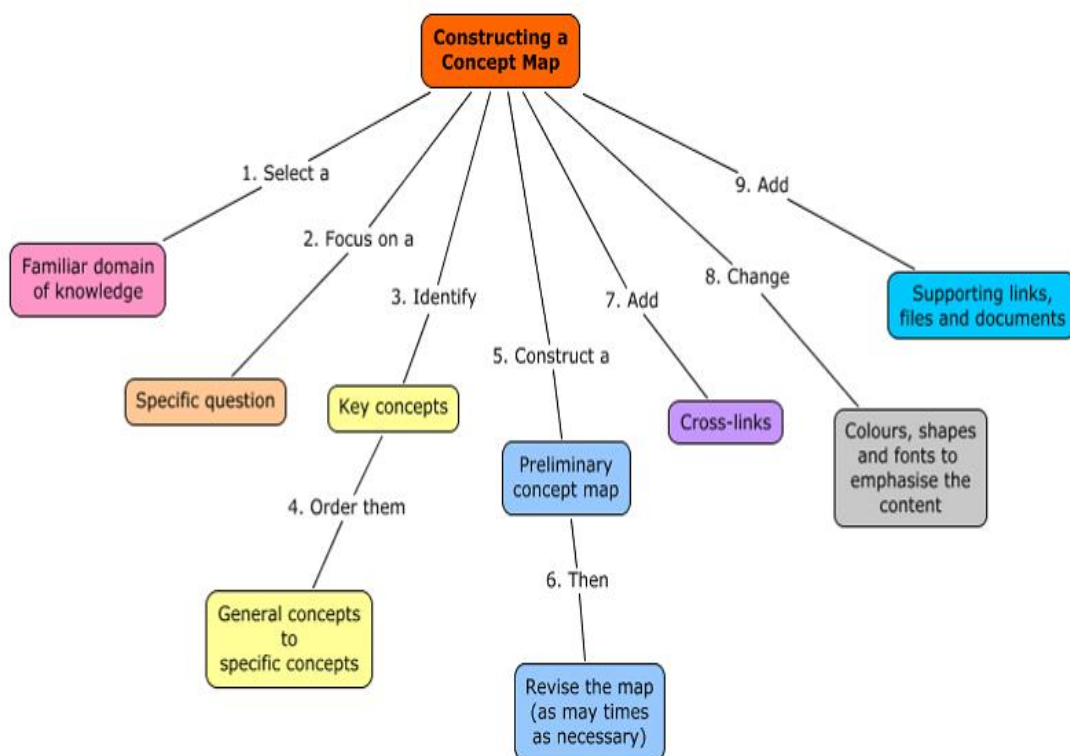


Figure 2. Linking words on concept map.

Figure 3 - Steps for constructing concept maps



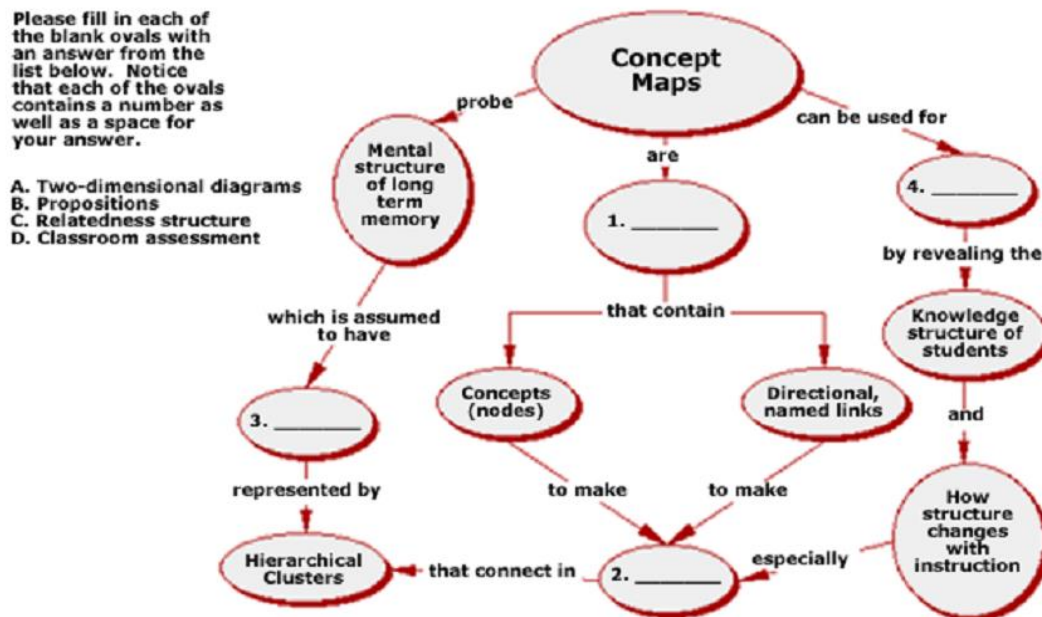
Collaborative learning with concept maps

Concept maps can be used in medical education to foster collaborative and team-based learning, enhance social interaction, encourage the role of students as teachers of other students, and allow learners to both view and reflect on their own knowledge structure within a non-threatening learning environment. **According to Novak and Gowin (1984)**, “students and teachers constructing concept maps often remark that they recognize new relationships and enhance new meanings or, at least, meanings they did not consciously hold before making the map”

Assessment Using Concept Maps

Another very powerful use of concept maps is as an evaluation tool, thus encouraging students to use meaningful-mode learning patterns. Concept maps are also effective in identifying both valid and invalid ideas held by students. They can be as effective as more time-consuming clinical interviews for identifying the relevant knowledge a learner possesses before (i.e. prior knowledge determination) or after instruction.

Figure 4 - Fill-in-the-blank concepts



Assignments for this Lecture:

- 1-What's the difference between a mind map and a concept map?
- 2-What is the advantage and disadvantage of concept map?
- 3-Try to apply this tool to your medical chemistry lecture?