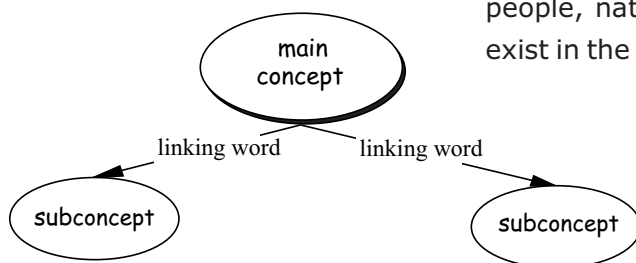


# Concept Mapping

A concept map is a visual representation of ideas where relationships are made explicit through arrows and linking words. A concept map usually begins with a central or main idea, under which related, subordinate ideas are placed.

## ► What is this learning strategy for?

Concept mapping is a visual tool that can help reveal students' prior experience. Importantly, concept mapping also enables students to create new knowledge through discovering connections among seemingly unconnected ideas and realities. The webbing of concepts, which students construct and deconstruct, also mirrors the complex relationships among people, nature's "goods and services," and technologies as they exist in the real world.



## ► Concept mapping is effective for several reasons

1. Environmental concepts are highly interrelated.
2. Information is organized in many ways, and students learn in many different ways, including visually.
3. Concepts can be understood more fully in relation to other concepts.
4. Visualizing connections helps students engage in more meaningful learning than does memorizing definitions.

## Concept Mapping (cont'd)

### ► How to use the strategy

1. Identify a key concept or an issue related to the content under study.
2. Provide time for pairs or groups of students to brainstorm subconcepts that are related to the main concept or issue. Further elaborate on the subconcepts by finding concepts that stem from them.
3. Ask students to link the concepts with arrows. Over each arrow, there must be a linking word or phrase that describes or defines the relationship between the concepts.
4. Provide time for students to revisit their concept map after further learning from videos, textbooks, or classroom notes.

### ► Ideas for introducing the strategy

1. On an overhead or a handout, engage students by showing them a sample concept map. Many concept maps such as the one on the next page can be found in teacher resource books or on the Internet.
2. Introduce the idea of a concept map to students by explaining it as a visual organizer of ideas. Especially in the secondary grades, many students may already be familiar with visual organizers, since they are widely used. A compare/contrast discussion of concept mapping with other visual organizers may be useful.

**Concept map checklist**

**1. Organization**

- main concept is clear
- subconcepts are clear
- linking words are used between concepts
- no linking lines crossed
- some cross-linkages between concepts

**2. Content**

- logical relationships between concepts and subconcepts are shown
- appropriate linking words used
- logical cross-linking occurs

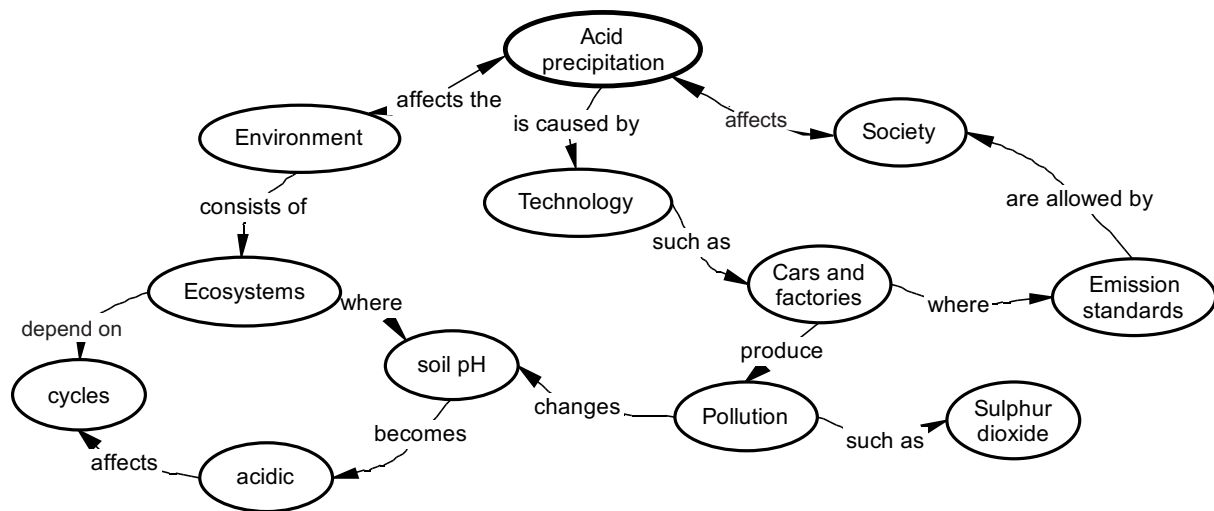
**3.** Ask students to study the sample concept map, and give them time to discuss questions and explore their ideas of a concept map. For example:

- How do you construct a concept map?
- How can the concept map help you organize what you know?
- How else can concept maps help you in your studies?

**4.** Construct a large concept map on the chalkboard, using a concept that the class has chosen by consensus (e.g., music, food production, sports).

► **Sample assignment: acid precipitation concept map**

Construct your own concept map illustrating how acid precipitation is an environmental issue that has interrelationships with science, technology, and society.



Source: Composite concept map adapted from students' work from C.W. Jeffreys C.I.

## Concept Mapping (cont'd)

### ► Assessment and evaluation

Concept maps can be used as diagnostic assessment for examining what students already know about a given topic. Students may compare their initial concept map with one that they complete at the end of unit of study. This allows both the students and the teacher to see what cognitive changes in learning have taken place. They can also be used in formative assessment or as an evaluation of what students have learned.

### ► Supporting students

- Provide support to students for whom this work is a new way of learning. For example, explain the social and academic benefits of group work, and use co-operative learning techniques to keep students focused on the task and to help them learn the necessary social skills.
- Post concept maps around the classroom.
- Conduct small-group instruction for teaching concept mapping. Encourage peer coaching by organizing students to work in mixed-ability groups.
- Provide opportunities for English as a Second Language/English Literacy Development(ESL/ELD) students to rehearse or explore ideas in their first language. For example, students may sometimes work with bilingual peers or tutors to confirm their understanding in their first language before transferring to English. Some students may wish to make notes, complete graphic organizers, or write a first draft in their first language in preparation for doing so in English.
- Have students write out concepts on small pieces of paper so that they can readily move concepts about before a final concept map is made.
- Work with the Special Education and ESL/ELD teachers on incorporating concept mapping into other learning areas for more practice. Provide dictionaries and vocabulary lists.

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### Visual organizers as assessment aids

A visual organizer is also useful in assessment, allowing second-language learners to display their knowledge and understanding, even though they may not yet know enough English to do so verbally. If students can complete an organizer with keywords, perhaps selected from a list provided by the teacher, they have understood the key concepts and are able to provide examples.

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► **Literacy**

Many students have difficulty expressing the relationship between concepts because of scarcity of connective words in their vocabulary. Help students acquire this vocabulary by discussing and naming different kinds of relationships, and linking words that describe these relationships. See chart below.

► **Technology**

Smart Ideas software is an electronic concept mapping program that supports the use of brainstorming, planning, organizing, and concept mapping.

**Concept mapping: Revealing relationships**

<b>Relationship</b>	<b>Example</b>	<b>Possible linking words</b>
Whole to part	Bike → Wheel ..... Cake → Flour ..... Microscope → Lens	Needs, uses, requires, contains, consists of
Part to whole	Leaves → Tree ..... Pages → Book ..... Mitochondrion → Cell	Is part of, belongs to
Cause–Effect	Cold Weather → Put on sweater ..... Climate Change → Increased storm intensity ..... High acidity → Eutrophication	Causes, results in, contributes to, is involved in, is a factor of