Concept Mapping

- What is a concept map?
- What are the features of a concept map?
- How do you construct a concept map?

What is a Concept Map?
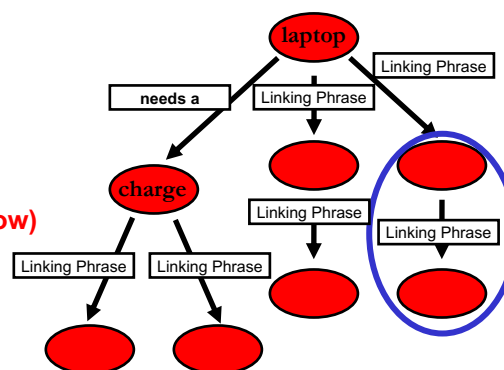
A Concept Map Includes:

Nodes
(terms or concepts)

Linking lines
(usually with a unidirectional arrow)

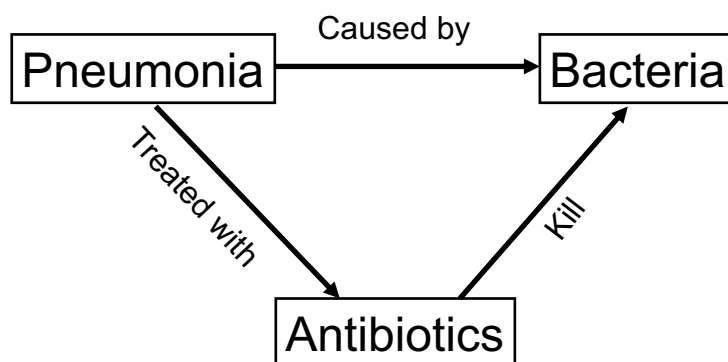**Linking phrases**

Propositions

Short Assignment

Arrange the following three terms and connect them with arrows and linking phrases

| Bacteria | Pneumonia | Antibiotics |

A Mini Concept Map

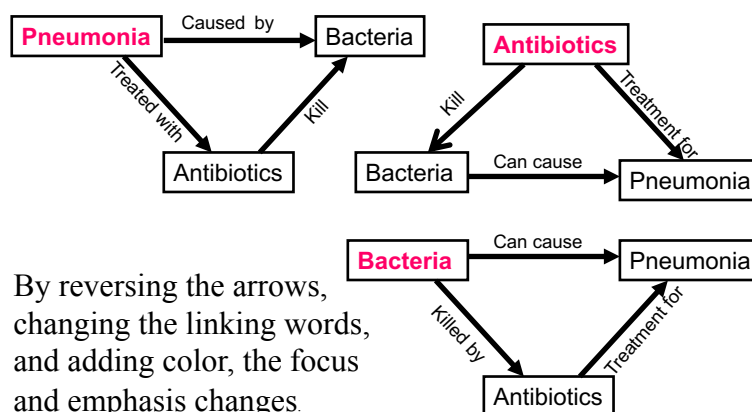Pneumonia → Caused by → Bacteria

Pneumonia → Treated with → Antibiotics
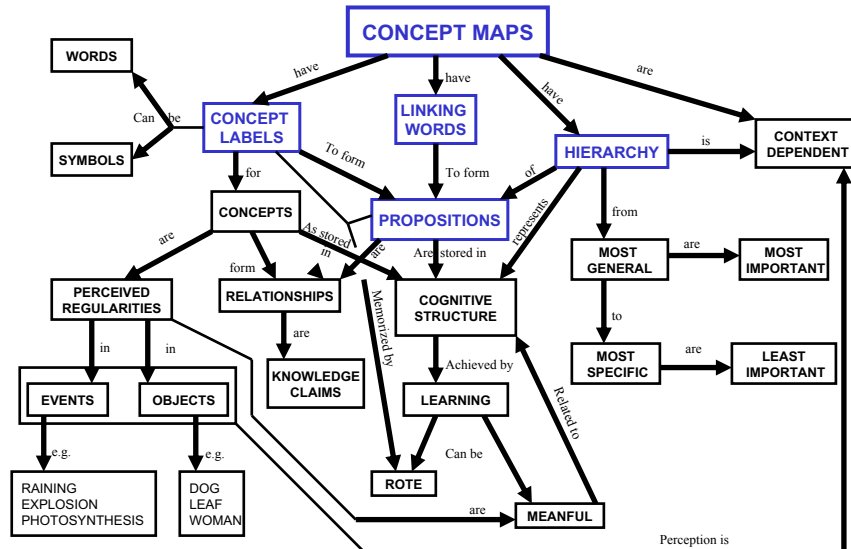
Antibiotics → Kill → Bacteria

Construct a Concept Map that summarizes the significance of the articles you are studying and can be useful to the rest of the class.

Variations on a Theme

By reversing the arrows, changing the linking words, and adding color, the focus and emphasis changes.

Concept Map Showing Key Concepts in Concept Mapping

CONCEPT MAPS

WORDS

CONCEPT LABELS — have — LINKING WORDS — have — HIERARCHY — are — CONTEXT DEPENDENT

SYMBOLS

Can be

is

To form

CONCEPTS — for

To form — PROPOSITIONS — of — HIERARCHY

As stored in — Are stored in

are — represents

PERCEIVED REGULARITIES — form — RELATIONSHIPS — are — COGNITIVE STRUCTURE

from — MOST GENERAL — are — MOST IMPORTANT

Memorized by

to

in — in

KNOWLEDGE CLAIMS

Achieved by

MOST SPECIFIC — are — LEAST IMPORTANT

EVENTS — OBJECTS

LEARNING

Related to

e.g. — e.g.

Can be

RAINING EXPLOSION PHOTOSYNTHESIS

DOG LEAF WOMAN

ROTE — are — MEANFUL

Perception is

Adapted from: Joseph Novak (1991) *Clarify with Concept Maps*, **The Science Teacher** 58(7), 45-49.

Stages in the Construction of a Concept Map

Brainstorming Stage

Organizing Stage

Layout Stage

Linking Stage

Revising Stage

Finalizing Stage

Brainstorming Stage

- List any and all terms and concepts associated with the topic of interest.
- Write them on Post It© Notes, one word or phrase per note.
- Don't worry about redundancy, relative importance, or relationships at this point.
- The objective is to generate the largest possible list.

Brainstorming Stage

Organizing Stage

- Spread concepts on a table or blackboard so that all can be read easily.
- Create groups and sub-groups of related items. Try to group items to emphasize hierarchies.
- Identify terms that represent higher categories and add them.
- Feel free to rearrange items and introduce new items omitted initially.
- Some concepts will fall into multiple groupings. This will become important in the linking stage.
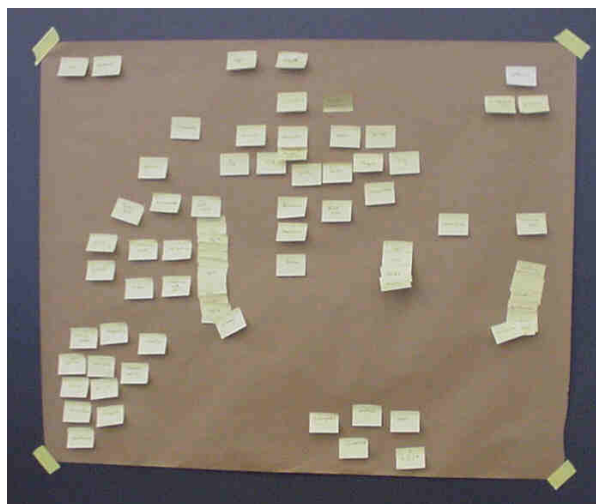
Organizing Stage

Layout Stage

- Arrange terms so that they represent your collective understanding of the interrelationships and connections among groupings.
- Use a consistent hierarchy in which the most important concepts are in the center or at the top.
- Within sub-grouping, place closely related items near to each other.
- Think in terms of connecting the items in a simple sentence that shows the relationship between them.
- Feel free to rearrange things at any time during this phase.
- Do not expect your layout to be like that of other groups.

Layout Stage

Linking Phase

- **Use lines with arrows to connect and show the relationship between connected items.**
- **Write a word or short phrase by each arrow to specify the relationship.**
- **Many arrows can originate or terminate on particularly important concepts.**

Revising Stage

- Carefully examine the draft concept map.
- Rearrange sections to emphasize organization and appearance.
- Remove or combine items to simplify.
- Consider adding color or different fonts.
- Discuss any aspects where opinions differ

Finalizing the Concept Map

- After your group has agreed on an arrangement of items that coveys your understanding, convert the concept map into a permanent form that others can view and discuss.

- Be creative *in a constructive way* through the use of colors, fonts, shapes.

Evaluating Concept Maps

- **Accuracy and Thoroughness**. Are the concepts and relationships correct? Are important concepts missing? Are misconceptions apparent?

- **Organization**. Is the concept map laid out in a way that higher order relationships are apparent and easy to follow? Does it have a title?

- **Appearance**. Is the assignment done with care showing attention to details such as spelling and penmanship? Is it neat and orderly or is it chaotic and messy?

- **Creativity**. Are there unusual elements that aid communication or stimulate interest without being distracting?