What does it mean when a student says, *I understand*?....

Does *understanding* mean the same thing to that student that it does to another student or to you, the professor?.....

How can students demonstrate their *understanding* to others?
Good Assignments Provide Accountability

Students can demonstrate what they understand.

Instructors can assess how well students understand.
Good Assignments Provide Closure to PBL Problems

- PBL problems are typically open-ended.
- Students within a single group often pursue different learning issues.
- Students frequently have difficulty knowing what the instructor thinks is important.
- Assignments focus on central issues and bring closure to PBL problems.
There are different ways to Wrap-up PBL Problems
Concept Mapping:

An Instructional Tool to Organize Content and Assess Student Learning

• What is a concept map?
• What are the features of a concept map?
• How do you construct a concept map?
• How do you use concept maps?
What is a Concept Map

“a general method with which one can clarify and describe people’s ideas about some topic in a graphical form”

Katsumoto 1997

a pictorial representation that shows the relationships between and among a connected set of concepts and ideas
Purposes for Concept Mapping

• Generate ideas (brainstorming)
• Design complex structures (long texts, web-sites)
• Communicate complex ideas
• Aid learning by explicitly integrating new and old knowledge
• Assess understanding or diagnose misunderstanding
CONCEPT MAP OF CONCEPT MAPPING

Propositions \(\rightarrow\) Ideas \(\rightarrow\) Linear Text \(\rightarrow\) Study & Revision Aid

Concepts: related by

Classroom Teachers \(\rightarrow\) Research & Assessment Tool \(\rightarrow\) Misconceptions

Misconceptions reveals

Research & Assessment Tool suitable for

Feelings & Values to do with

Affective Objectives: related by

Learning: may develop

Metacognition: awareness of

Learning Processes: may increase

Learning Effectiveness: improving

Enjoyment: such as increasing

Motivation: increasing

Interest: such as improving

Adapted from K. S. Taber (1994) Physics Education 29(5) 276-281
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 PBL.
- Write them on cards, one word or phrase per card.
- Don't worry about redundancy, relative importance, or relationships at this point.
- The objective is to generate ten cards.
Brainstorming Stage
Organizing Stage

- Spread concepts on table 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
Layout Stage
Linking Stage

• Use 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 conveys 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.
Develop a Concept Map

Problem-Based Learning
Wrap-up and Discussion of Concept Maps

- How similar or different were the concept maps produced by the different groups?
- How do you think you might use concept mapping in your courses?
- What do you perceive as problems in using concept mapping as an assignment?
- Was this session helpful?