

## **7.391 Concept-Centered Teaching Semester I**

**Discussion Day 2: February 22, 2006**

### **Decide on Discussion Group Times**

Wednesday 4 pm

Thursday 4 pm

Friday 2 pm

### **Activity**

- Ask the students to come up with a concept taught in introductory-level biology.
- Write the concept on the board and have the class break the statement down into individual concepts.
- Discuss how students in an intro class can get confused by complex ideas that we take for granted and the levels of understanding it takes to explain the original concept.

### **Confronting Student Misconceptions**

#### **I. Background about misconceptions**

1. At what age do students develop misconceptions?
2. How are these misconceptions seeded?
3. Is a student more likely to have misconceptions in science classes than in other subjects?
4. Do certain groups of students come into a class with different misconceptions based on race, gender, social status, etc.?

#### **II. What are misconceptions?**

1. How can we identify what misconceptions our students have in a timely manner before the class begins?
2. How can we confront the misconceptions that our students have?
3. How can we make our students aware of their misconceptions?
4. How do we reinforce truths?
5. How can we design a curriculum that enforces concept-centered teaching?

6. Does concept-centered teaching work for all ages?
7. If we make our students aware of their misconceptions, do we actually risk causing the misconception to take a greater hold?
8. How do we combat misconceptions, when those very same thoughts may be reinforced in other settings?

### III. Questions specific to the readings

1. How are two-tiered questions used in these studies? Do you feel these types of questions are effective means of assessing student misconceptions? How do “strategic test-takers” fair in these assessments?
2. Did the teachers in these examples bias the results by his/her bias towards the effectiveness of concept-centered teaching? Are the assessment methods appropriate?
3. How were the questions to test misconceptions formulated? How do you pinpoint misconceptions if you do not know what your students do not understand?
4. Because different scientific disciplines teach the same processes, like diffusion and osmosis, from different angles, can we write exams that keep in mind all the different views of the same processes?
5. How could we apply the conceptual change method to larger classroom settings?
6. Is the conceptual change method a new way of teaching, or just a way of systematically doing what effective teachers do automatically?
7. Can such a method be used by high school teachers that were only forced to “know” material in college, and never really came to “understand” the material themselves?
8. How do you delineate between what people “know” and what they “understand”?