Van de Walle, Chapter 1, & Overview of Standards 2000 (Draft)

The NCTM is currently revising the *Standards*. There is a web site devoted to providing information and getting feedback about the current draft. The document I handed out in class is from this web site. The eventual resulting document is already being referred to as *Standards 2000*. (But this may change, notice that NCTM refers to it as *Priciples & Standards*.)

1. Answer the question in the first two paragraphs of the chapter.
2. What does NCTM stand for? What kind of organization is NCTM?
3. What are the three "*Standards* documents"? What is contained in each?
4. What changes in society does Van de Walle claim necessitate a change in the way mathematics is taught?
5. Do you agree with Van de Walle that "mathematical thinking has become indispensable in even the most ordinary jobs"? (page 4)
6. What are three ways technology is changing school mathematics?
7. What are the four "theme standards"?
8. Look at the list of changes in emphasis proposed as part of the *Curriculum Standards* (Appendix A). Pick two of these shifts that you find especially noteworthy and explain your choices. (A shift may be noteworthy because it is controversial, important, surprising, impractical, intimidating, political, etc., or because you disagree with it.)
9. Briefly describe three types of mathematical connections.
10. Look at the list of five shifts in classroom environment. How do the mathematics classes you had in school compare? Are they more like the "towards" list or the "away from" list? Which shifts do you think you would have appreciated most as a student? Which do you think would be hardest to implement as an instructor?
11. This document begins by presenting four "societal needs for mathematical understanding". What are they? How do they compare with question 4?
12. How many standards were in the old version? How many are in the new? What is the difference?
13. What is the NCTM terminology for what Van de Walle calls the "theme standards"? What additional standard has been added to this category? (Note: you will see that this additional standard shows up often in Van de Walle too.)
14. The draft of what will become NCTM's *Standards 2000* does not include a list of changes in emphasis like those referred to in question 8. Why do you think this has been eliminated?

Van de Walle, Chapter 2

1. What is your reaction to the second paragraph (beginning "The description of...")?
2. The *Curriculum Standards* lists five goals for students.
   (a) Based on your experience in school mathematics classes, rate yourself in terms of each of these goals.
   (b) Which goals do you think will be hardest to have your students achieve?
   (c) If you were making a list of goals for the mathematics program at a grade school or junior high, what would you add to or delete from this list?

3. What does Van de Walle mean when he says that "all mathematics can be understood"? (You may want to return to this question and revise your answer after you have read the entire chapter.)

4. In the second edition of this book, the section on children's perspectives was entitled "Math Does Not Come From the 'Math God'". What do you think was meant by that?

5. Make a list of a couple of (mathematical) things that you know (or knew) how to do, but don't (or didn't) "understand". Do you wish you understood them? If you have forgotten how to do them, do you think you would have remembered better if you had understood better?

6. In school, were you ever asked to solve a mathematical problem of a type you had never seen before? How did you feel (or would you have felt)?

7. Do you agree that doing "paper and pencil computation" is not "doing mathematics"? Why or why not? What is "mathematics"? How can you tell when someone is "doing mathematics"?

Van de Walle, Chapter 3

1. What is the distinction Piaget makes between "assimilation" and "accommodation"? Who was Piaget?

2. Briefly describe procedural knowledge of mathematics and conceptual knowledge of mathematics. Which is more important? Why? Which should come first? Why?

3. What is instrumental understanding? What is relational understanding? What does it mean that these are at the ends of a continuum?

4. What type of knowledge is particularly susceptible to instrumental learning?

5. What does Van de Walle say understanding is a measure of? (Put another way, what increases as someone understands something better?)

6. List several benefits of relational learning.

7. How can models be used incorrectly? What is the result?

8. What does Van de Walle say is "the single most important ingredient for effective learning"? What does Van de Walle mean by this term? What is the opposite of this? Do you think he has given a good name to this? Can you come up with a better name for what he is trying to express?

9. What can a teacher do to promote reflective thinking? Can you add to Van de Walle's list?

Van de Walle, Chapter 4; Long & DeTemple, Chapter 1

1. What (according to Van de Walle) is the difference between a problem and an exercise?

2. What is Polyá's four-step framework for problem-solving?

3. Van de Walle claims that "we know that listing [Polyá's four] stages or explaining them to students does very little to help them become better problem solvers." Why do you think this is the case? If Van de Walle's claim is true, why are they important?

4. What do Lappan and Briars claim is the most important decision a mathematics teacher makes?

5. Van de Walle lists several heuristics for solving problems. In LDT 1.2–1.5, 13 problem-solving strategies are listed. Compare the lists: which strategies appear on both lists? only in LDT? only in VdW? Are there any strategies we have used that are not on either list?