

## **Review of Minnesota Academic Standards First Draft in Science by Susan B. Chaplin**

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The science standards are comprehensive and progress from a simple to a complex view, as one would expect for knowledge presented during academic development of the student.

However, as a college educator, I find the curriculum far too content heavy and far too light on the process of science. Educators know that students learn best by doing, not listening, not memorizing, not regurgitating. There is too much reliance on memorization of factoids and too little emphasis on application and problem solving. Content can always be mastered, but students today need help learning HOW TO FIND ANSWERS and HOW TO THINK THROUGH PROBLEMS. The science curriculum proposed, and in fact I would generalize to all K-12 education standards, produces a lazy student who prefers to be told exactly how to do everything and can't think analytically. The content proposed for the 9-12 standards in the life sciences is exactly the same content that any introductory set of college biology courses would cover. We should not be repeating the content from high school to college; we should be building on it. As a college educator I find that my freshman students really don't know or remember anything from their high school science courses, because they memorized it in the context it was presented and have no ability to apply it, even if they do remember it.

My recommendation is to back off some of the heavily laden content objectives and build in some process oriented exercises that encourage students to think through a problem and use resources to solve that problem. Cookbook labs that make students follow directions are HORRIBLE and should be greatly reduced in the new curriculum. Problem solving exercises, and even problem based learning based on case studies would be extremely helpful in preparing college-bound students.