



# U.S. METRIC ASSOCIATION, INC.

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Remarks at the National Math Advisory Panel

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Thank you for allowing me to be here today to discuss the subject of improving math education through improving measurement education and student learning of measurement in U.S. schools.

Having seen no discussion of measurement in the Panel transcripts that have been posted to date on your Web site, I don't know if you have discussed it, so please allow me to outline the status of measurement education in the U.S.

In 2003, the National Council of Teachers of Mathematics (NCTM) published its yearbook on the subject of measurement, entitled *Learning and Teaching Measurement*. In it, it states that "Results from the NAEP international assessments indicate that students' understanding of measurement lags behind all other mathematics topics." Today, I will share some of the causes and suggest a different strategy for teaching measurement.

It is also germane to my proposal today to share this quote with you from the 1966 NCTM yearbook, *The Metric System of Weights and Measures*. Forty years ago,

John R. Clark who was the honorary chairman of the National Council of Teachers of Mathematics, which he helped to establish, stated in the *Foreword* this inalienable fact, *"From the point of view of teaching and learning, it would not be easy to design a more difficult system than the English system. In contrast, it would seem almost impossible to design a system more easily learned than the metric system."*

This is a very strong point to consider during your deliberations on improving measurement education, a subject in which students are floundering. This 1966 yearbook contains dozens of articles by respected authors of the time about the advantages of both educating students in the metric system and the economic advantages to the U.S. in using the metric system, all still true today, I am proud to share with you the fact that J.T. Johnson who headed this Yearbook Committee was also a former president of the U.S. Metric Association that I am here to represent today.

Further on the status of measurement education. published article abound pointing out the difficulties students have in learning to measure, even on the most elementary aspects of measurement, including reading and using a ruler. With respect to students' metric system knowledge, chemistry teachers complain that they have to rob time from teaching chemistry because students don't know the metric system and they must teach it first. College professors report that too many students enrolling in university classes do not have sufficient skill in math nor the metric system to pass their courses. Companies complain that it's difficult to find metric-knowledgeable workers.

Two sizeable studies have been done by researcher Richard Phelps and by E. James Tew when he was Quality Assurance Manager at Texas Instruments. These works provide evidence of the unchallenged superiority of teaching and using the metric system, respectively. In addition, a Metric Bibliography CD, compiled by my association is available. It is a database of references to articles about metric from the mid-1940s to the present. And also see our Web site at [www.metric.org](http://www.metric.org) for a wealth of information.

Teachers report that they would welcome in-service training in the metric system. As President of the U.S. Metric Association, I have the advantage of having discourse with many individuals who contact us about their metric system concerns. Throughout the year, teachers request information on teaching the metric system. Many freely admit that they have weak metric system backgrounds and they are insecure in teaching it. Each year during October when Metric Week is celebrated, teachers and even entire schools take the opportunity to *try out* teaching the metric system to their students. Our newsletters abound with articles about these exciting experiences. Students report they liked learning it and teachers report how easy they found it to teach. Some students say why don't we use the metric all the time. It's so easy.

Teachers also report they are confounded by trying to teach two measurement systems concurrently, resulting in students mixing up the units between the two systems and learning neither system well, *if at all*. Student test scores support their conclusions.

Because it is a fact, the superiority of the metric system has long been touted. But because the inch-pound system is still used in some applications in the U.S., proponents insist that it be taught. But this is the 21st century and the truth is, inch-pound use is waning and metric use is accelerating here in the U.S.

Here's some sage advice from one of your colleagues. Kathie Olsen, Deputy Director of NSF and ex-officio member of this Panel, has the right philosophy that must be the keystone of all education reform. In a speech last year, Dr. Olsen quoted hockey-great Wayne Gretzk who said "I skate to where the puck is going to be, not to where it has been." Paraphrasing Gretzk in the educational context, she said that means "teach to where the kids are going, not to where they have been."

Here's my proposal

Cleanse the curriculum of the inch-pound system. Yes, I am proposing that you remove it completely from the curriculum through grade six. True, the inch-pound system is still around in the U.S. but this is poor rationale to teach it to young children. It has no relevance to elementary school students' needs. They're not doing comparison shopping and there is absolutely *no* evidence to show that teaching the inch-pound system is an aid to learning math. Instead, the reverse is true. After the 4th grade, student scores in math and science plummet on 8th and 12th grade national and international tests, clear evidence that they didn't master basic math concepts in grammar school.

The "I hate math" syndrome, so common in the U.S., is partly the outgrowth of trying to teach two measurement systems. The high achieving students of Japan and Singapore, and for that matter students in all other countries, learn only the metric system.

Measurement is an easy subject for them because the metric system is easy to learn and use, and it gives them a foundation for success in advanced math and science courses.

They quickly develop ability with decimals measures while American youngsters are perplexed by fractions, like  $11/16$  and  $3/8$ , at a time when they cannot yet comprehend fractions well. Our dual measurement philosophy leads students to confusion and fuels failure, and perhaps worse still to their avoidance of taking higher math and science courses.

Thank you very much.