Thank you for that kind introduction – I’m truly honored to represent Battelle at the official release of Technically Speaking: Why All Americans Need To Know More About Technology.

I’d like to commend the National Academy of Engineering and the National Research Council for their support of this study, and I’d especially like to recognize Greg Pearson and A. Thomas Young along with their fellow committee members, for their part in assembling such a thorough and thoughtful document. Doug Olesen, Battelle’s recently-retired CEO and my predecessor, served with Tom on a corporate Board of Directors and shared Tom’s commitment to this project as do I.

I’ve been asked to comment on the importance – and role – of technological literacy from an “industry perspective.” I will do so in a somewhat parochial manner. Surely most everyone attending this Symposium agrees that technological literacy – or the lack of it – profoundly affects all of us as workers, consumers, and citizens. So, rather than “preach to the converted” about its “importance,” I’ll offer a few “real-life” thoughts and observations I hope will confirm what we already believe. And I’m going to take the liberty of briefly exploring a couple of topics which at first may appear slightly off the subject, but which in fact have a direct impact on technological literacy.

To establish a context for some of my comments, let me give you a bit of background about Battelle. We’re an international, billion-dollar-a-year organization with about
7,500 employees worldwide and we have clients in 30 countries. We have on-staff expertise in carbon, nuclear, and alternative energy, aerospace, medical and chemical products, agrifood, transportation and automotive technology, the environment, and health and human services. Our business has three distinct but equal focal points: contract research and development for others, management of national laboratories, including Oak Ridge, Brookhaven and Pacific Northwest National Laboratories, and technology commercialization.

Perhaps that gives you some idea why the phrase “Putting Technology To Work” is part of our corporate logo – and why you can bet we’re mighty interested in “technological literacy.”

The staff of Battelle are professionals who are naturally curious, highly educated, and not afraid of analyzing and interacting with the world around them – in other words, they’re not just technologically literate, they’re technologically proficient.

As educators, civic leaders, business people and employers, we should do all we can to encourage those who are inclined toward technology-based careers. Many companies seek to utilize their resources such as money, products and people to support local educational initiatives directed at general literacy and increasingly toward elements of technology literacy. Toward that end, Battelle, too, takes part in several technology-intensive projects for students who demonstrate an aptitude for science. For example:

?? Battelle will be among the sponsors for the 2003 International Science & Engineering Fair (ISEF) – the only international science project fair competition for grades 9-12 – which encourages pre-college students to conduct scientific research;

?? Battelle sponsors the local FIRST Robotics competition in Cleveland and Columbus in which a team of students builds a robot and competes locally, regionally, and nationally for scholarships;
Battelle sponsors the *Invention Convention*, a regional K-12 competition for college scholarships where individual students identify a need or problem and “invent” a solution;

Battelle employees serve as corporate mentors and role models in the form of interesting people and of a diverse background for aspiring young scientists between 14 and 19 by setting up challenging projects for the *Center of Science and Industry (COSI) Academy* to work on over the course of the school year; and

Finally, we do provide summer experiences with teachers in a technology environment.

Less common but I believe is more needed, to move us toward achieving the goals outlined in *Technically Speaking*, are the cooperative and focused efforts of companies to other institutions’ work at a systems level that embraces not only single schools or districts, but to extend to regionally or statewide institutions.

With our partners in the Ohio Business Roundtable – a statewide business leadership group that includes a broad spectrum of Fortune 500 companies as well as businesses hoping to grow – we recently launched the *Battelle For Kids* initiative, which I’ll talk more about in a moment.

But those who are very much at ease with technology – people, for example, who work at places like Battelle – have long since assimilated the integral relationship technology has with the world around them. *Technically Speaking* outlines the need for, and benefits of, enhanced technological literacy among the general population. Improved technological literacy would illustrate the relationship between technology and our everyday lives, illuminate the decision-making process for consumers, and enable every citizen to more fully participate in an informed democracy.
That challenge takes on added importance for an organization like Battelle and other technology-reliant companies.

You see, our assignments sometimes take Battelle into territory that may intimidate, if not frighten, the technologically uninformed or faint of heart. For example, we sometimes work with “scary stuff” that has to do with health, or national security, or the environment. We also work with a lot of “complicated stuff” – “stuff” that may sort mountains of raw data into high-value information, “stuff” that redistributes electricity in a power grid, or “stuff” that even scatters neutrons off of materials to better help us understand and design new things to help solve new problems. So, our mission – and we do choose to accept it – is to soothe the anxieties of those who are less technologically inclined and help them become more comfortable with products and processes that can be difficult to understand but in the context of their everyday experiences.

Those “anxieties” are not all personal or individual. Sometimes they spill over into public policy issues and influence political decisions. And when that occurs, Technically Speaking correctly points out how the individuals involved “...will benefit from a considerable understanding of the nature of technology, and an awareness that all technologies involve trade-offs and may result in unintended consequences. With a higher level of technological literacy as a whole, people in positions of power will be more likely to manage technological developments in a way that maximizes the benefits to humankind and minimizes the negative impacts.” (p. 50)

I’m reminded of two examples from my former life as Kodak’s Chief Technology Officer in which better “technological literacy” might have assuaged some contentiousness, and perhaps some expense for the community and the company.

Being in the film and photo processing business, Kodak manufactures large amounts of chemicals. When environmental concerns at a factory site were raised and remediation efforts were undertaken, I remember announcing at a public hearing with great satisfaction that new technology was in place to decrease a particular effluent by huge
amounts so that we had moved from measuring pollution in “parts per million” to “parts per billion.” I also remember my surprise at the reaction – many of those in attendance took that to mean our levels of pollution had increased! I was reduced to describing fractions on television.

To complete another massive remediation project, Kodak moved what seemed like acres of earth to a distant landfill and utilized a tremendous amount of machinery, man-hours and money to remove the chemical equivalent of a half-pint of paint stripper! Had a greater level of technological literacy informed the decision processes in that project, it’s possible that different priorities, and different resource allocations, would have accomplished just as much good for the environment.

I recognize that improving technological literacy is the task at hand. It’s not my intent to divert our focus, but rather sharpen our focus by taking a slight detour, returning to my first example, and talking for a moment about basic literacy. I think you’ll agree that unless we cultivate and fortify basic literacy skills, the foundation of technological literacy quite simply crumbles beneath the weight of our good intentions.

Technically Speaking recommends aligning academic standards and stressing the connection between technology and virtually every classroom subject to raise the level of technological literacy among students enrolled in primary and secondary schools. Of course, this is valid – and necessary. But we must not neglect basic literacy – that is, the ability to read, write, add, subtract, reason logically and understand that “parts per billion” is in fact a smaller number than “parts per million.” And without securing our foundation in basic literacy, exploring ways to improve technological literacy is premature.
What is the magnitude of the challenge, and why is it pertinent to a discussion of technological literacy? Consider for a moment that one in every ten American adults is functionally illiterate. For those who are functionally illiterate, the “three distinct dimensions” of technological literacy – knowledge, ways of thinking and acting, and capabilities – have been severely truncated.

I’m sure all of you are aware that just about every state has directed a considerable amount of resources, energy and effort to improve K-12 education, especially student performance in reading and writing. And the business community has been actively involved in education reform because we recognize that nothing less than our future is at stake – we need to hire and train qualified workers, we need to compete in a global marketplace, and we need to rise with the crest of the information technology wave or it will wash us away.

The Battelle For Kids initiative I mentioned earlier is a statewide initiative that began with the support of the Ohio Business Roundtable with a $10 million dollar gift from Battelle. It is an effort to help ensure that students leave Ohio high schools prepared for productive work and effective citizenship. Its goals are to advocate, mobilize support, and establish a user-friendly and generally accessible baseline of data for a statewide system in which standards, assessment and accountability are aligned; as much in the way similar programs in Texas and North Carolina are attempting to do. High performance is achieved through capacity building at the classroom level; and business leadership being sustained and persistent. I believe the long-term results from our initiative will improve the performance of Ohio’s educational system in ways that will also enhance technological literacy. I was impressed by the point made by a question relating to use of technology. I will take that back to the state design team. Schools in every state, however, can benefit from partnerships with their communities and local businesses, and I encourage all of you to assist and be involved with the schools in your local and statewide areas.
I’m confident that this initiative is consistent with many of the recommendations that arose from this project. For example, Technically Speaking calls for technological literacy to be “...consistently reinforced in schools and in informal education settings,” and for “...rigorously developed standards, curriculum, and assessments...” to be “...developed and put in place...”

Technically Speaking also encourages business and government to get involved with “informal education settings” where exhibits and “hands-on” demonstrations illustrate how technology affects our daily lives. This is an especially effective way to reach those who are no longer enrolled in secondary or post-secondary education. Toward that end, Battelle actively supports the Center of Science and Industry (COSI) and many of our executive staff frequently speak to local community and service groups about the work we do.

Whether technological literacy is promoted through formal or informal education, Technically Speaking cites the importance of acknowledging how technology influences – and is influenced by – all that precedes or surrounds it. In other words, technology and virtually everything it touches – science, history, social studies, civics, language, arts, even philosophy – are inextricably entwined. Neither technology nor the ways it’s used spring forth from a vacuum.

That’s one of the points I tried to make last week when I spoke to students and faculty at the Governor’s School for Science and Mathematics in South Carolina about “Putting Technology ToWork.” I used the development of digital cameras as the example. Yet even among an elite cadre of that state’s best and brightest high school juniors and seniors, and in a place where technology is openly embraced if not outright adored, the concept that true innovation depends on all that precedes it was something of a revelation.

We may never be able to totally dislodge the sense of technology as a mixed blessing that lingers in the popular mind – I suspect it’s a vestige of the fiercely independent, frontier
spirit that carved this country from the wilderness – but we can, and must, make our citizens feel more at ease with technology.

I think the challenge facing those of us involved in education, industry, public policy, the media and even the arts is best summarized in a quote from the National Science Board:

“We must return to the basics, but the ‘basics’ of the 21st century are not only reading, writing, and arithmetic. They include communication and higher problem-solving skills, and scientific and technological literacy – the thinking tools that allow us to understand the technological world around us.” (p. 35, Technically Speaking)

I believe we must also reduce the level of functional illiteracy and cultural ambivalence about the role technology plays in our lives. Those of us whose businesses embrace and utilize technology must stay involved with our schools and communities, be willing to clarify the civic and political debate that surrounds new technological developments, and take every opportunity to show technology as a critical element of everything we do and will do – day in and day out. Nothing less than our future is on the line.

I’m proud that Battelle was able to support this important project, and I’ve enjoyed sharing some thoughts with you at this National Symposium on Technological Literacy.

Thank you.