What can I do to encourage my child?

- Take advantage of the science and technology museums in your area. If there isn't one in your neighborhood, many museums are putting information and activities on the Web for young people to explore. One favorite is The Spirit of American Innovation (*www.thetech.org/nmot)*.

- When you buy a product that's "new and improved," talk with your child about the innovation that makes it "new and improved." Why do companies do this? Does your child have any ideas for making it even better? What would she do?

- Involve your child in programs that encourage invention and innovation, such as one of the following.

  ❑ The Technology Student Association (TSA) is a national, nonprofit organization for middle and high school students with an interest in technology. Assisting TSA's diverse population of 200,000+ student members are educators, alumni, parents, and business leaders. TSA offers competitions and programs, while providing information about becoming a technology teacher (*www.tsaweb.org)*.

  ❑ The Junior Engineering Technical Society is a nonprofit education organization, established in 1950 to inform and excite young people about careers in engineering. JETS hosts an annual competition for students to solve a real-world engineering problem (*www.jets.org*).

  ❑ FIRST (For Inspiration and Recognition of Science and Technology) is a multinational nonprofit organization that aspires to transform culture, making science, math, engineering, and technology as cool for kids as sports are today. FIRST has an annual robotic competition for high school students and a FIRST Lego League for students ages 9–14 (*www.usfirst.org)*.

Activities to do together

1. Build a boat that floats. Give your child equal-sized pieces of tin foil, wrapping paper, and paper. Tell her the objective is to design and build a boat that can hold nine objects (marbles, pebbles, paper clips) for 10 minutes or to design and build a boat that can hold the most objects without sinking. Do this many times, allowing your child to improve her design.

2. "Reverse Engineer." Select an item that is used regularly in your home (hair dryer, toaster, or television) and determine what and how many parts and materials are in it. Research where the materials came from (i.e., locations of the raw materials), determine how to best dispose of the materials (i.e., what can be recycled, re-used, etc.), or figure out how to manufacture the item using automated equipment.

What references are available to help me support my child's interest in technology?

Web sites

- Awareness Campaigns for Technology (A.C.T.)
  www.iteaconnect.org/ACT
- Invent Now
  www.invent.org/index.asp
- NASA
  http://kids.msfc.nasa.gov
- Society of Hispanic Professional Engineers
  http://oneshpe.shpe.org/wps/portal/national
- Society of Women Engineers (SWE)
  www.swe.org
- Technology for All Americans Project
  www.iteaconnect.org/TAA/TAA.html
- The International Technology Education Association
  www.iteaconnect.org
- National Center of Technological Literacy
  http://mos.org/doc/1505
- National Education Association
  www.nea.org
- National Society of Black Engineers
  www.nsbe.org

Museums

- Association of Science-Technology Centers (ASTC)
  www.astc.org
- Children's Museum of Pittsburgh
  www.pittsburghkids.org
- Cranbrook Institute of Science
  www.cranbrook.edu
- Exploratorium: The Museum of Science, Art and Human Perception
  http://exploratorium.edu
- Museum of Science, Boston
  www.mos.org
- Museum of Science & Industry
  www.mosi.org
- The Tech Museum of Innovation
  http://thetech.org
- Oregon Museum of Science and Industry
  http://omsi.edu/explore

NATIONAL EDUCATION ASSOCIATION nea.org
Great Public Schools for Every Child
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www.nea.org/parents

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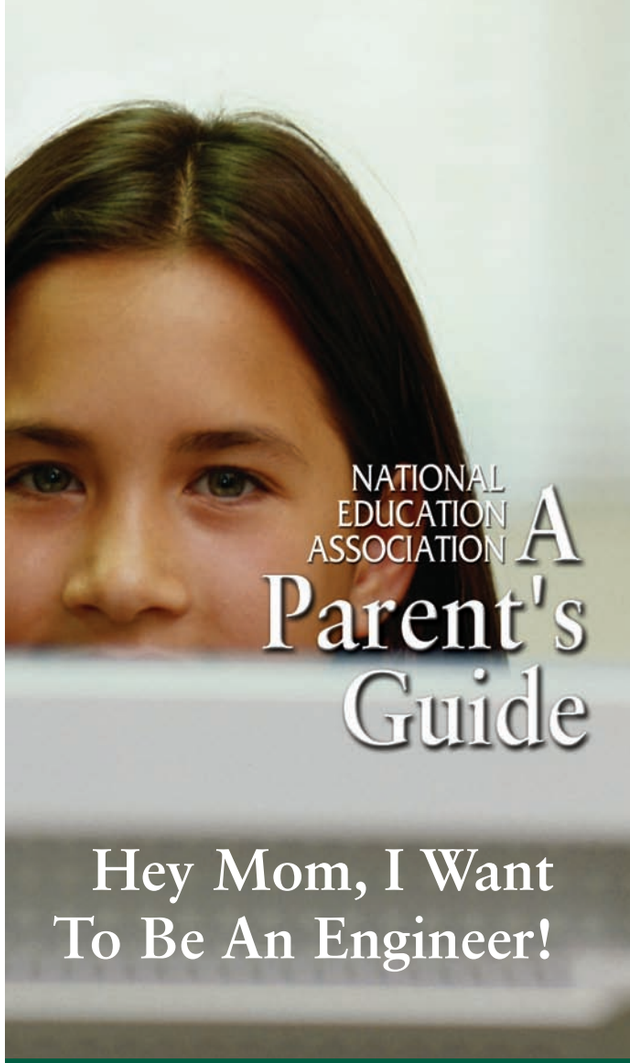

A Parent's Guide to Helping Your Child Become Technologically Literate

Joint Project of NEA and ITEA

NATIONAL EDUCATION ASSOCIATION nea.org Great Public Schools for Every Child

PTA everychild. onevoice.® www.pta.org

ITEA

New and Improved! How often do we see products declaring themselves to be "new and improved?" How do products become new and improved? In a word—INNOVATION. Technology and innovation go hand in hand. Thanks to technology and innovation, we drive more energy-efficient cars, download music to our iPods©, use cell phones to take photos, and do so many things our parents or grandparents never even imagined. While technology and innovation are critical to these and other lifestyle products, they are even more important to fields such as agricultural technology, where improving processes and products can have an enormous effect. Innovation in technology holds out the promise of a better quality of life for everyone.

Why should students be technologically literate?

In the coming century, our students will be making decisions about technologies that we have not even begun to dream of. Students need experiences in laboratory classrooms that allow them to apply practical problem-solving skills to real world situations. Students use problem—solving skills to:

- Choose the best tools/products for their work
- Operate technology properly
- Troubleshoot when something is wrong

Technologically literate students will need to make decisions in the future about the role of new technologies in society.

What do kids do in a technology class?

They think about and solve problems like:

- Cleaning a polluted lake or river
- Creating an invention to solve a household problem
- Designing and building a habitat for a unique situation

Second-graders might design and make a home for their favorite bug. They would draw a plan (complete with measurements) and use boxes and other materials to build the home. They would have to think creatively about how to keep the bug in the house, how to provide water and food, and how to make sure the home was the right size for their pet.

Fifth-graders might design and make their own paper airplanes. They would test them to see which ones flew the furthest or the highest and then revise the design to see if they could make a better paper airplane. They would use mathematics, learn aviation science, and practice reading and writing skills throughout the design process.

Eleventh-graders might investigate the idea of growing plants in a hydroponic system (without soil). They would design, build, and test the system. They would study the effect of this type of growing on the environment and figure out whether this system was more cost effective than growing plants in soil. They would become engineers!

Young people apply technology to find solutions to problems facing society. Creative problem-solving provides ways for students to address issues that affect themselves, their families, or their communities. The thinking process required for designing and applying new technologies is closely related to those used by an engineer, a hi-tech worker, a designer, or an architect. When those juniors in high school study hydroponics, they think creatively about ending hunger and about how to grow food in places where the soil is not ready for planting.

What content should I expect my child to be learning?

What students should know and be able to do is identified in standards developed by the National Science Foundation (NSF) and NASA– *Standards for Technological Literacy: Content for the Study of Technology*. Standards for K–12 were formally reviewed by the National Academy of Engineering, the National Research Council, and the technology teaching community.

The standards address content for K–12. Content is integrated into thematic units at the elementary levels, while course titles at the middle and high school levels may include:

- Exploring Technology
- Innovation and Engineering Design, Technological Systems
- Engineering Design Fundamentals
- Inventions/Innovations

The standards also address medical, agricultural and related bio-technologies, energy and power, information and communication, transportation, manufacturing, and construction topics.

Does a school need special equipment to have a technology program?

Most projects in elementary schools can be carried out in the regular classroom. Some projects and activities require tools, so a large area where cutting and using hammers and screwdrivers will be necessary. Most high schools have classroom-laboratories.

These facilities usually have the following:

- Research and design area
- Space where students can construct, build, or complete activities
- Facility for students to test and experiment
- Space for individual learning stations that allow for specific studies on technical topics such as rocketry and telecommunications

What effect does teaching technology have on our workforce and society?

The workforce of the future must have the ability to use, manage, and understand technology. By the year 2014, the Department of Labor expects an increase of 28.4 percent in professional, scientific, and technical services (Department of Labor, 2004). That's 1.9 million new jobs!