

Excerpts from a New Book (Volume 1) by Harry T. Roman – Applied Science and Technology for Gifted Students – Estimated Publication Date: Spring/Summer 2015

Introduction

Technology is the driving force in the world economy, providing jobs and helping to create whole new industries. Today, experts believe the great flowering of ideas and industrial processes that flowed from the mind of Thomas Edison alone are responsible for one-fourth of all the jobs on the planet. He has been dead since 1931.

We are in the midst of even greater technological change; witness the incredible activity centered about our smart phones, computers, and wireless telecommunications. The hand-held products streaming from inventors and entrepreneurs are mind-boggling with much more to come.

This volume (Volume 1 of a two-part book series) contains a variety of fascinating science and technology subjects, most of which are followed by a “Think About This” section to further stimulate student thinking and analysis. The second half of this book has 10 detailed activities for use in your G&T classroom – so have at it with the students. Engage them; empower them to think out-of-the-box. Accept nothing less. Stretch those young minds! Be happy and productive, and keep your eyes out for Volume 2 from Gifted Education Press.

Harry T. Roman

Science, Technology and Engineering

“Science is about understanding the origins, nature, and behavior of the universe and all it contains; engineering is about solving problems by rearranging the stuff of the world to make new things.” These words were spoken in by Dr. Henry Petroski, famous U.S. engineer, professor and author. Julian Simon, famous economist explained technology as, “the know-how to convert what we have into what we want.”

Science, technology and engineering work together to give us the capability to understand and change our world; and engineers are the masters of the human designed world with technology as their tool. Engineers have: -Put us on the Moon -Built our bridges and major structures -Built and maintain all our utilities and infrastructures -Designed and built our telecommunications systems -Provide the electricity to make our infrastructures work -Protect us with national defense systems -Harness our natural resources -Manufacture the goods we use every day -Improve our quality of life.

Engineers are about making the science and technology work together for the benefit of Earth’s inhabitants.

Think About This

Have your students identify great scientists and engineers in history. Also look at the great technologists/inventors as well. Have some of these great people come from your state?

What subjects do engineers study in college and why?

Research and discuss the history of engineering in the world. How far back does the profession of engineering go?

How many engineers are there in the U.S. today? What kinds of annual salary do they make compared to the average national salary?

Quotes about Technology

The definition of technology has varied over the decades, but the Merriam-Webster dictionary defines technology as:

“Application of knowledge to the practical aims of human life or to changing and manipulating the human environment.

Technology includes the use of materials, tools, techniques, and sources of power to make life easier or more pleasant and work more productive. Whereas science is concerned with how and why things happen, technology focuses on making things happen.”

Empower your students to delve into the definition of technology and absorb the array of quotes listed below about technology. They should spend time also exploring the words “science,” “engineering,” and “innovation” as well. They can research the individuals below who made the quotes too.

Many people see technology as the problem behind the so-called digital divide. Others see it as the solution. Technology is neither. It must operate in conjunction with the business, economic, political and social system. Carly Fiorina

Any sufficiently advanced technology is indistinguishable from magic. Arthur C. Clarke

The science of today is the technology of tomorrow. Edward Teller

Never before in history has innovation offered promise of so much to so many in so short a time. Bill Gates

Technology is a gift of God. After the gift of life it is perhaps the greatest of God's gifts. It is the mother of civilizations, of arts and of sciences. Freeman Dyson

(Think hard about this one!)

Computers are useless. They can only give you answers. Pablo Picasso

The iPod completely changed the way people approach music. Karl Lagerfeld

Technology is the campfire around which we tell our stories. Laurie Anderson

What a computer is to me is the most remarkable tool that we have ever come up with. It's the equivalent of a bicycle for our minds. Steve Jobs

Energy: Solar Thermal Power Conversion

There you are in the hot, sunny southwestern deserts of our nation, standing in the middle of a solar thermal power conversion station. Soaring above your head, about 300-400 feet off the ground is the metal-ceramic composite steam boiler, mounted on a massive shaft of concrete and steel. Stretched around your entire field of vision in all directions are giant heliostats or mirrors, designed to track the sun's movement across the sky. These 35-foot tall mirrors will focus the sun's light onto the big steam boiler producing lots of steam to run a traditional turbine-generator to make electricity. Steam temperatures approaching 2000 degrees F. will be achieved.

All the mirrors stretching out before you will occupy a desert surface area approximately 1 square mile in size, capable of generating 100 MW of power – enough for 40,000-50,000 homes. If the sun does not shine for a day or so, there will be a special kind of salt, stored in large tanks, that will be able to store in chemical form, the sun's excess energy... and reproduce it upon demand. If there should be a sand storm in the desert, the heliostats will be able to “stow” themselves into a face-down position to protect their highly polished surfaces.

Think what this could mean for America's energy future if the now unproductive desert areas become sites for clean, green, power generation! Such plants, on a smaller scale, are already demonstrating how this technology is ready to go commercial, and may soon become a vital part of our national electric grid.

Think About This

What kinds of environmental concerns might there be with the location of solar thermal power stations in the desert?

How does the energy generated get distributed back to the local utility system?

Why do you think the steam boiler is made from a ceramic-metal composite instead of just metal?