The Standards and Benchmarks for Technological Literacy

Standard 17 - Students will develop an understanding of and be able to select and use information and communication technologies.

In order to select, use, and understand information and communication technologies, students should learn that:

K-2

A. Information is data that has been organized.
B. Technology enables people to communicate by sending and receiving information over a distance.
C. People use symbols when they communicate by technology.

3-5

D. The processing of information through the use of technology can be used to help humans make decisions and solve problems.
E. Information can be acquired and sent through a variety of technological sources, including print and electronic media.
F. Communication technology is the transfer of messages among people and/or machines over distances through the use of technology.
G. Letters, characters, icons, and signs are symbols that represent ideas, quantities, elements, and operations.

6-8

H. Information and communication systems allow information to be transferred from human to human, human to machine, and machine to human.
I. Communication systems are made up of a source, encoder, transmitter, receiver, decoder, and destination.
J. The design of a message is influenced by such factors as intended audience, medium, purpose, and the nature of the message.
K. The use of symbols, measurements, and drawings promotes a clear communication by providing a common language to express ideas.

9-12

L. Information and communication technologies include the inputs, processes, and outputs associated with sending and receiving information.
M. Information and communication systems allow information to be transferred from human to human, human to machine, machine to human, and machine to machine.
N. Information and communication systems can be used to inform, persuade, entertain, control, manage, and educate.
O. Communication systems are made up of source, encoder, transmitter, receiver, decoder, storage, retrieval, and destination.
P. There are many ways to communicate information, such as graphic and electronic means.
Q. Technological knowledge and processes are communicated using symbols, measurement, conventions, icons, graphic images, and languages that incorporate a variety of visual, auditory, and tactile stimuli.

*The information below is adapted from the ITEEA's *Kids Inventing Technology Series.*

Introduction

The world is rapidly changing due, in part, to advances in communication and information processing technologies. These technologies started as tools to support speech and personal communication. Today, people have a vast array of communication options including printed media, the telephone, radio, television, cellular telephones, and computer systems.

Information and communication are terms that are often used together but are different phenomena. Information is data (individual facts, statistics, and numerical data) and ideas that have been sorted and arranged. Communication is the act of exchanging ideas, information, and opinions. If people use devices and systems to communicate, communication technology is involved.

Communication technology communicates information using either graphic or wave systems. Graphic communication systems use drawings, pictures, graphs, photographs, or words on flat surfaces to convey information and ideas. These systems include printed media, photographic communication, and technical (engineering and architectural) drawings. Wave communication systems use electromagnetic radiation (light, sound, or electrical waves) to send information. These systems include broadcast communication and telephony.

Communication Process

The basic communication process uses four major steps to move the information from the sender to the receiver. These are:

- Encoding: Forming the message in a way that it can be communicated.
- Transmitting: Delivering the message to the receiver.
- Receiving: Gathering the message from the transmission medium.
- Decoding: Forming the message in a way that the recipient understands it.

At any point in the communication process, the message may be stored for later retrieval. This can include recording, warehousing, etc.

Producing messages

Messages that are produced for mass audiences are carefully planned and produced.
They are designed, prepared for production, produced, and delivered. Communication messages are planned (designed) to give people information, entertain them, or cause them to take action. A format is selected, information about the audience and the message is gathered, and copy, layouts, or scripts are prepared. The messages are prepared for production by bringing the format, copy, and illustrations together in a pleasing arrangement or manner. The messages are produced using printing or recording techniques. The planned media is made ready for the consumer. Finally, the message is delivered to the audience. Books and magazines are physically delivered while wave messages are sent through the air or over cables. Without communication technologies, we would know little about the world around us. We would live a very sheltered life.

Did you know?

- The first recorded messages were produced about 10,000 years ago when people started to carve shapes on clay tablets.
- Written language using characters started about 5000 years ago.
- Samuel F. B. Morse developed the first operational telegraph system.
- In 1895, Guglielmo Marconi applied these theories for a wireless communication system he called the wireless telegraph (radio).