calculating and modeling

storing and processing information

digital coding

9-12

Computers have greatly improved the power and use of mathematical models by performing computations that are very long, very complicated, or repetitive. Therefore, computers can reveal the consequences of applying complex rules or of

Miniaturization of information processing hardware can increase processing speed and portability, reduce energy use, and lower cost. Miniaturization is made possible through higher-purity materials and more precise fabrication technology.

Digital coding of information (using only 1's and 0's) makes possible more reliable transmission, storing, and processing of information.

Computer modeling explores the logical consequences of a set of instructions and a set of data. The instructions and data input of a computer model try to represent the real world so the computer can show what would actually happen.

Use computers for producing tables and graphs and for making spreadsheet calculations.

6-8

Mathematical models can be displayed on a computer and then modified to see what happens.

An increasing number of people work at jobs that involve processing or distributing information. Because computers can do these tasks faster and more reliably, they have become standard tools both in the workplace and at home.

Errors can occur in coding, transmitting, or decoding information, and some means of checking for accuracy is needed. Repeating the message is a frequently used method.

Most computers use digital codes containing only two symbols, 0 and 1, to perform all operations. Continuous signals (analog) must be transformed into digital codes before they can be processed by a computer.

What use can be made of a large collection of information depends upon how it is organized. One of the values of computers is that they are able, on command, to reorganize information in a variety of ways, enabling people to make more and better uses of

Insert instructions into computer spreadsheet cells to program arithmetic calculations.

Numbers can be represented by using sequences of only two symbols (such as 1 and 0, on and off); computers work this way.

Use computer databases to store and retrieve information.

3-5

Read and follow step-by-step instructions in a calculator or computer manual when learning new procedures.

Computers can be programmed to store, retrieve, and perform operations on information. These operations include mathematical calculations, word processing, diagram drawing, and the modeling of complex

Mistakes can occur when people enter programs or data into a computer. Computers themselves can make errors in information processing because of defects in their hardware or software.

Computers are controlled partly by how they are wired and partly by instructions called programs which are entered in a computer's memory. Some instructions stay permanently in the machine, but most are coded on disks and are

People have invented devices such as paper and ink, engraved plastic disks, and magnetic tapes for recording information. These devices enable great amounts of information to be stored, retrieved, and sent to other people or

K-2

Letters and numbers can be used to put things in a useful order.

There are different ways to store things so they can be easily found later.

Numbers can be used to count things, place them in order, measure them, or name them.