NATIONAL SCIENCE EDUCATION STANDARDS

A. Science as Inquiry

Abilities necessary to do scientific inquiry
Understanding about scientific inquiry

E. Science and Technology

K–4

Understandings about science and technology

- People have always had problems and invented tools and techniques (ways of doing something) to solve problems. Trying to determine the effects of solutions helps people avoid some new problems.
- Tools help scientists make better observations, measurements, and equipment for investigations. They help scientists see, measure, and do things that they could not otherwise see, measure, and do.

5–8

Understandings about science and technology

- Many different people in different cultures have made and continue to make contributions to science and technology.
- Science and technology are reciprocal. Science helps drive technology.

G. History and Nature of Science

K–4

Science as a human endeavor

- Many people chose science as a career.

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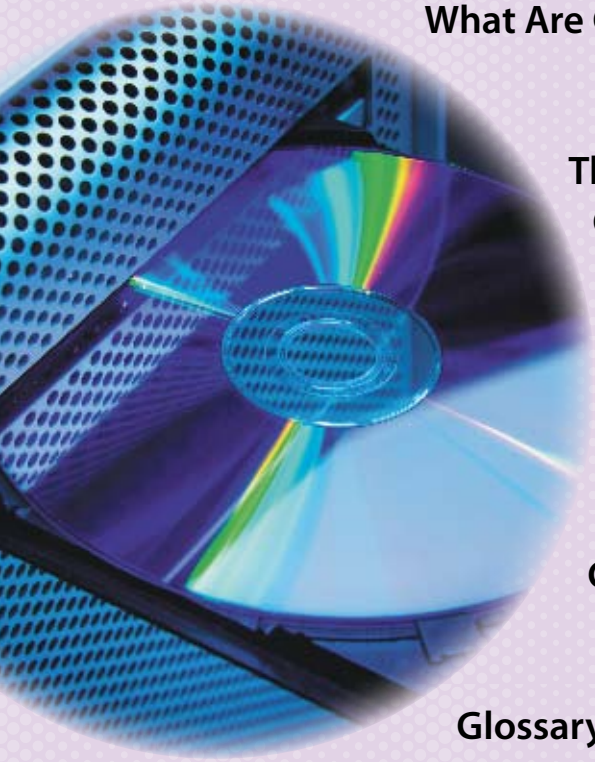

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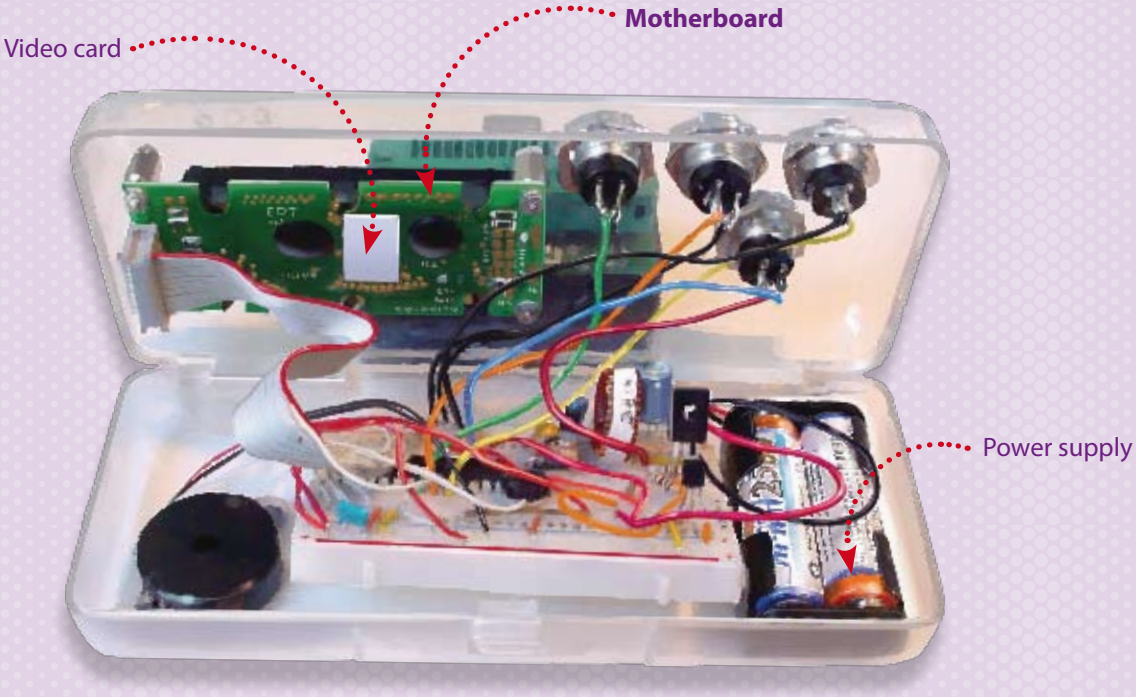
Inside the Box

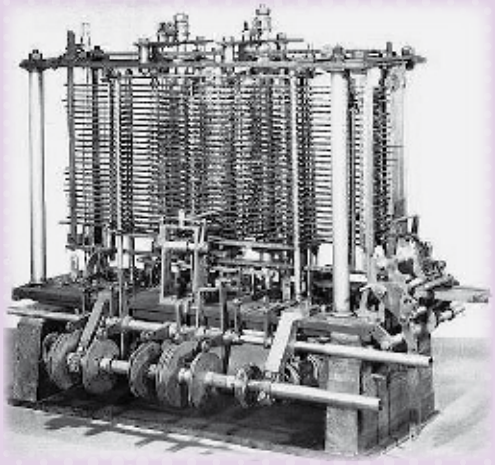
Here's what you'd see if you took off the cover of a handheld computer game.



Larger computers aren't really very different from handheld computers. A desktop computer will probably have extra parts, such as a DVD player or a full-size keyboard. The important difference, though, is memory size.

A computer with 3 gigabytes of memory can act on 3,000,000,000 instructions in a single second!

giga = 1 billion (10^9)



Charles Babbage's analytical engine

Inventing Computers

In the 1800s, when children were playing with toys like homemade dolls, wooden wagons, and hoops and sticks, Charles Babbage was designing a machine that is considered to be the first mechanical computer.

The first modern computers were built in the 1940s. They used lots of **vacuum tubes** and were huge—just one computer filled a whole room!

Over time, engineers figured out how to make computers smaller by replacing their vacuum tubes with **circuit boards**. By the 1970s, people could buy desktop computers to use at home.

Better Batteries

What if you want to play games while traveling or when you're not at home? This requires batteries! Handheld computers would not have been possible if scientists hadn't invented the battery first. Batteries give enough electrical energy so game systems don't have to be plugged in to work.

The Italian scientist Alessandro Volta invented the first battery in 1799— more than 200 years ago!

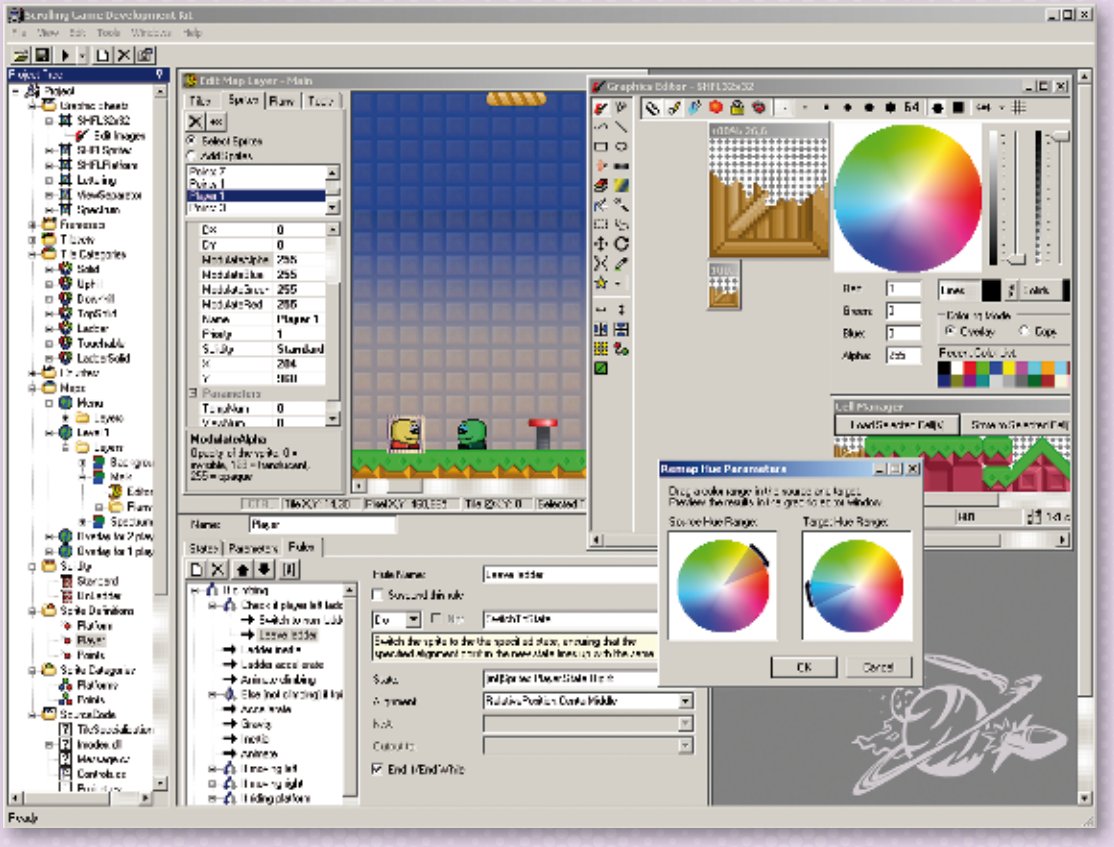
As computers and devices such as cell phones got smaller, scientists had to make batteries smaller, too. Tiny batteries can now store more power than ever before.

An early handheld computer game battery—actual size

A recent computer game battery—actual size

Did you know that some batteries can even recharge without being plugged in? Resonance recharging is when batteries use **induction** to recharge themselves.

Once the writers have a good idea for the story, with its settings, artists design the look of the game. They draw **storyboards** to figure out what a gamer will see on the screen at every moment in the game. Some artists create the characters while others create the **backgrounds**.

Next, the programmers and engineers use computer programs to make the characters walk, talk, run, and jump. Then they add sound.

It can take as many as 200 people and cost up to $30 million to make just one computer game.