

## FIRST PRIZE ESSAY FOR MIDDLE SCHOOL, BY THOMAS AHLIN

### Transistors Connect American Teenagers

I am a product of the electronic age! With the click of a mouse, I can research any topic. The toggle of a joystick allows me to play games with friends miles away. A touch on a screen lets me enjoy thousands of songs on a player the size of a postage stamp. The electronic tablet stores textbooks and novels and can take and keep my favorite pictures. My television accesses hundreds of channels, and programs can be recorded and viewed at will. These are examples of devices that rely on transistors!

The transistor is a three-terminal electronic device with two important functions. Transistors amplify signals, such as radios, and switch a digital circuit. A digital circuit is used in any device that has logic.

Invented in 1947, developers John Bardeen and Walter Brattain from the Bell Telephone Laboratories were trying to understand the state of electrons at the interface between metal and a semiconductor. Their invention sparked an enormous research effort in solid-state electronics. In 1956, Bardeen and Brattain were rewarded for their efforts with the Nobel Prize in Physics.

The first commercial transistor applications used signal amplification for hearing aids and radios. Transistors replaced vacuum tubes because they were smaller, consumed less power, and were more reliable. For many years, transistors were made as individual electronic components connected to other components on boards to make an electronic circuit. Computers using transistors appeared in the late 1950's. In the late 1950's, Jack Kilby and Robert Noyce developed the integrated circuit which allowed several transistors to be on the same semiconductor. The integrated circuit is what makes electronic devices that I use so small.

As an American teenager, some of my electronic devices are tools, some are toys, and some are both tools and toys. I live in a world where transistors provide technology that exceeds the dreams of my parents' generation by being able to communicate with millions via voice, word, and picture.

#### Works Cited

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