Gordon Moore is a cofounder of © Intel Corporation. In 1954, Moore received a Ph.D. in chemistry and physics from Caltech. After his success in the semiconductor industry, Moore and his wife donated $600 million to Caltech, the largest gift ever to an institution of higher education.

EXAMPLE 4 Graphing Exponential Growth

In 1975, Gordon Moore said that the number of transistors that can be placed inexpensively on an integrated circuit will double approximately every 2 years. This trend is known as Moore's Law and has continued for more than 35 years. One explanation for the accuracy of Moore's prediction is that the law is used in the semiconductor industry to guide long-term planning and to set goals for research and development. In this sense, the law has been a self-fulfilling prophecy.

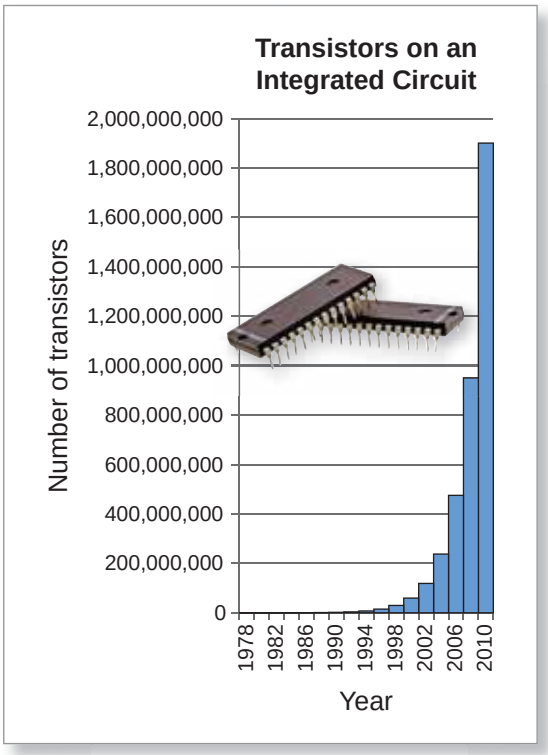
In 1978, the Intel® 8086 held 29,000 transistors on an integrated circuit. According to Moore's Law, how many transistors could be placed on an integrated circuit in 2010? Graph the results.

SOLUTION

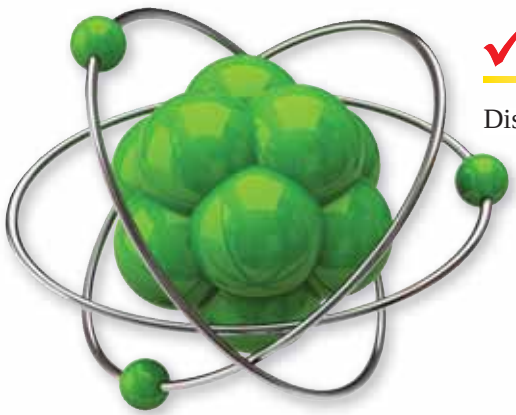
From 1978 to 2010, the number of transistors doubled 16 times.

DATA

	A	B
1	Year	Number of Transistors
2	1978	29,000
3	1980	58,000
4	1982	116,000
5	1984	232,000
6	1986	464,000
7	1988	928,000
8	1990	1,856,000
9	1992	3,712,000
10	1994	7,424,000
11	1996	14,848,000
12	1998	29,696,000
13	2000	59,392,000
14	2002	118,784,000
15	2004	237,568,000
16	2006	475,136,000
17	2008	950,272,000
18	2010	1,900,544,000



According to Moore's Law, about 2 billion transistors could be placed on an integrated circuit in 2010.



Checkpoint

Help at Math.andYOU.com

Discuss the following claim that Moore's Law will reach its limit.

> "Moore's Law, the central driver of our age, is based on the idea that circuit lines can be drawn ever-closer together. But there has to be a limit. The atomic scale. You can't make a circuit smaller than an atom."
>
> "Moore's Law Reaches its Limit with Quantum Dot Amplifier," Dana Blankenhorn