

# The Big Bang Model

The beginning of the universe included a sudden expansion from very hot, very dense conditions over 13.8 billion years ago.

The Big Bang created all of the matter that eventually turned into stars and galaxies.

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**The Big Bang model helps explain the rapid expansion of the universe.** While scientists don't know what caused the initial expansion, the model shows how the universe cooled and transformed energy into all of the matter that eventually became a part of galaxies, stars, planets, moons, and even you. But the expansion didn't happen at just one point in space—this rapid expansion happened **everywhere**, because there was no space before it. Using several techniques, including determining the ages of the oldest stars, scientists have estimated that this expansion began more than 13.8 billion years ago. That's a lot of birthday candles for the universe! Scientists think the universe was extremely hot right after the Big Bang, and it has cooled substantially over time. Now, the relic energy of the Big Bang, which fills the entire universe, is only about 3 degrees above absolute zero—that's about  $-454^{\circ}$  Fahrenheit!