

GLOSSARY

COBE

The Cosmic Background Explorer, a space probe that was put into orbit by NASA in 1989 to detect weak microwave radiation astronomers thought would be left from the Big Bang explosion.

CONSTELLATION

Small group of stars within eyesight of Earth that were assigned names according to the patterns they form in the sky.

DOPPLER EFFECT

The illusion that sound and light change as their sources approach us or recede from us.

GALAXY

A large group of stars such as the Milky Way, of which our solar system is a part.

MICROWAVES

A kind of energy, electromagnetic radiation, which for the purposes of this program we call “special radio signals.”

MILKY WAY

The large galaxy, consisting of millions of stars, in which our solar system is located.

NEBULAE

Clouds of gas and dust in space, from which new stars form.

SPECTRUM

A rainbow of colors produced when light is passed through a prism.

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Show Me Science

The Wonders of Astronomy & Space

K4557DVD

Astronomy: The Sky Isn't Falling

Advanced Teachers Guide

SYNOPSIS:

The sky, in fact the whole universe is expanding, perhaps as a result of the Big Bang, an event many cosmologists think took place about 15 billion years ago. This program looks at the Universe and explains the Big Bang theory.

CURRICULUM UNITS:

- Astronomy
- Physics
- General science
- Cosmology
- Engineering

CAREER OPPORTUNITIES:

- Astronomer
- Chemist
- Aerospace engineer
- Cosmologist
- Earth science
- Engineer
- Physicist
- Radio operator

PROGRAM OVERVIEW:

This program tells the history of Cosmology. The ancient Greeks noticed that groups of stars formed patterns in the sky and gave these constellations names. Their word for all the stars, “galaxy” meant “in the heavens.” Using more powerful telescopes and photography, American astronomer Edwin Hubble was able to see that some nebulae, which astronomers had always thought were clouds of gas and dust within the Milky Way, were actually very distant Galaxies more than two billion light years away. Discover how Hubble determined that these galaxies are speeding away from us and how this discovery led to the conclusion that the universe is expanding, perhaps from a huge explosion.

ISSUES & CRITICAL THINKING:

- 1) Discuss topics such as the electromagnetic spectrum, the Doppler effect, spectral analysis, cosmic background and radiation.
- 2) Ask the students the following:
 - a) What is a galaxy?
 - b) What discovery by Edwin Hubble led to the idea that our universe is expanding and the Big Bang theory?
 - c) How did Edwin Hubble discover that the other galaxies are speeding away from us?
 - d) How long ago do astronomers think the Big Bang happened?
 - e) What kind of evidence of the Big Bang did astronomers think there would be?
- 3) The distance to the closest neighboring galaxies is about two million light years. Explain to the class that if they asked someone in another galaxy a question, it would take two million years for their question to reach the other galaxy and another two million years to get a reply.
- 4) Allow students to experiment with prisms, diffraction gratings or commercially available spectroscopes.
- 5) Set up a visit to a planetarium.