

1.E: Science and the Universe - A Brief Tour (Exercises)

For Further Exploration

Books

Miller, Ron, and William Hartmann. *The Grand Tour: A Traveler's Guide to the Solar System*. 3rd ed. Workman, 2005. This volume for beginners is a colorfully illustrated voyage among the planets.

Sagan, Carl. *Cosmos*. Ballantine, 2013 [1980]. This tome presents a classic overview of astronomy by an astronomer who had a true gift for explaining things clearly. (You can also check out Sagan's television series *Cosmos: A Personal Voyage* and Neil DeGrasse Tyson's current series *Cosmos: A Spacetime Odyssey*.)

Tyson, Neil DeGrasse, and Don Goldsmith. *Origins: Fourteen Billion Years of Cosmic Evolution*. Norton, 2004. This book provides a guided tour through the beginnings of the universe, galaxies, stars, planets, and life.

Websites

If you enjoyed the beautiful images in this chapter (and there are many more fabulous photos to come in other chapters), you may want to know where you can obtain and download such pictures for your own enjoyment. (Many astronomy images are from government-supported instruments or projects, paid for by tax dollars, and therefore are free of copyright laws.) Here are three resources we especially like:

- Astronomy Picture of the Day: apod.nasa.gov/apod/astropix.html. Two space scientists scour the Internet and select one beautiful astronomy image to feature each day. Their archives range widely, from images of planets and nebulae to rockets and space instruments; they also have many photos of the night sky. The search function (see the menu on the bottom of the page) works quite well for finding something specific among the many years' worth of daily images.
- Hubble Space Telescope Images: www.hubblesite.org/newscenter/archive/browse/images. Starting at this page, you can select from among hundreds of Hubble pictures by subject or by date. Note that many of the images have supporting pictures with them, such as diagrams, animations, or comparisons. Excellent captions and background information are provided. Other ways to approach these images are through the more public-oriented Hubble Gallery (www.hubblesite.org/gallery) and the European homepage (www.spacetelescope.org/images).
- National Aeronautics and Space Administration's (NASA's) Planetary Photojournal: photojournal.jpl.nasa.gov. This site features thousands of images from planetary exploration, with captions of varied length. You can select images by world, feature name, date, or catalog number, and download images in a number of popular formats. However, only NASA mission images are included. Note the Photojournal Search option on the menu at the top of the homepage to access ways to search their archives.

Videos

- Cosmic Voyage: www.youtube.com/watch?v=qxXf7AJZ73A. This video presents a portion of Cosmic Voyage, narrated by Morgan Freeman (8:34).
- Powers of Ten: www.youtube.com/watch?v=0fKBhvDjuy0. This classic short video is a much earlier version of Powers of Ten, narrated by Philip Morrison (9:00).
- The Known Universe: www.youtube.com/watch?v=17jymDn0W6U. This video tour from the American Museum of Natural History has realistic animation, music, and captions (6:30).
- Wanderers: apod.nasa.gov/apod/ap141208.html. This video provides a tour of the solar system, with narrative by Carl Sagan, imagining other worlds with dramatically realistic paintings (3:50).

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