

Visual Guide: Overview of Ebook Features

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Click on any image to open it in a separate window. In the bottom right corner of the image window, you will find the size tools: the magnifying glass with a + sign will zoom in, the magnifying glass with a - sign will zoom out, and the circular arrow will reset the image to its original size. Click on the "X" in the upper right corner to close the image window and return to the ebook.

Summary Self-Test

Sun and the Solar System.

- LG 4** The scientific method is an approach to learning about the physical world. It includes observation, forming hypotheses, making predictions to enable the testing and refining of those hypotheses, and repeated testing of theories.
- LG 5** Scientists often represent information graphically. Reading a graph means looking carefully at the axes and the trends in the data, which can be found from the slope.

SUMMARY SELF-TEST

- Rank the following in order of increasing size: Sun, Virgo Supercluster, Earth, Solar System, Local Group, Milky Way Galaxy, universe.
- If we compare our place in the universe with a very distant place,
Correct! The laws of physics are different in each place.
a) The laws of physics are different in each place.
b) All of the laws of physics are the same in each place.
c) Some laws of physics are the same in each place, but we don't know about others.
- The poetic statement "We are stardust" means that
Incorrect Earth exists because of the collision of two stars.
a) Earth exists because of the collision of two stars.
b) Atoms in our bodies have passed through (and in many cases formed in) stars.
c) Earth is primarily formed of material that used to be in the Sun.
d) Earth and the other planets will eventually form a star.
- The scientific method is a way of trying to _____, not prove, ideas; thus all scientific knowledge is provisional.

For multiple-choice questions in the Summary Self-Tests at the end of chapters, students can click on the answer to see if they are correct. This is a self-test so answers to the questions are not saved and cannot be collected for grading purposes.

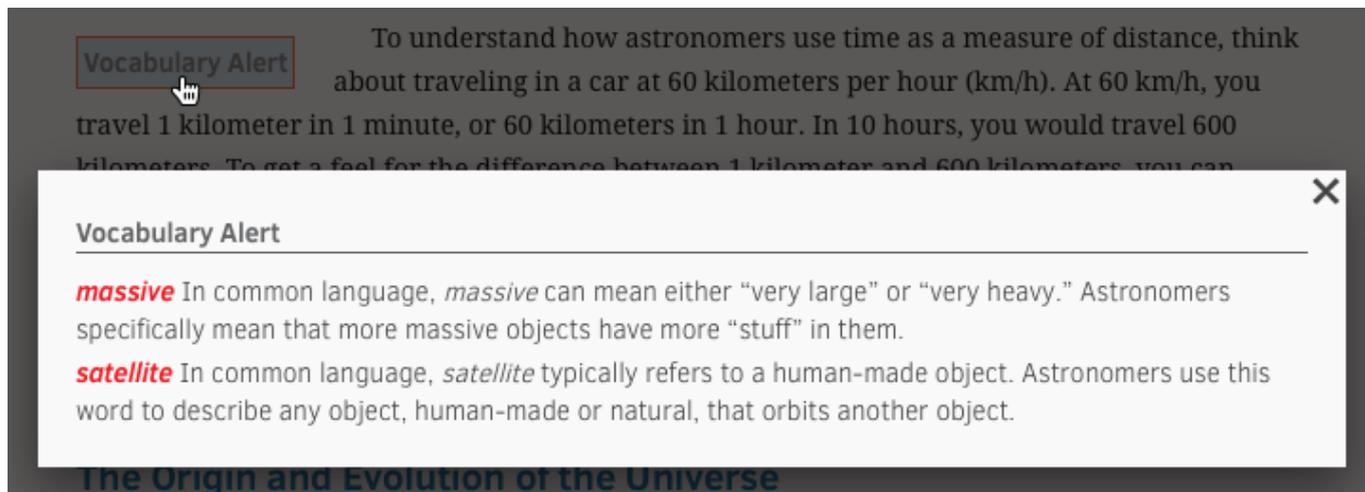
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Next Section ►

If other products or study aides are available for your textbook, links to those resources can be found in your ebook. Click on the link to proceed to that resource.

Vocabulary Alerts



Click on the "Vocabulary Alert" button to open a separate window that defines keywords presented in that section of the ebook. Click on the "X" in the upper right corner of the window to close the Vocabulary Alert and return to the ebook.

Vocabulary Words in the Text

up of rocks that contain large amounts of silicon and various other elements. The human body contains carbon, nitrogen, oxygen, sodium, phosphorus, and a host of other elements. If these elements were not present in the early universe, where did they come from?

massive Containing mass.

The answer to this question begins deep within stars. In the core of a star, less **massive** atoms, like hydrogen, combine to form more massive atoms, eventually leading to atoms such as carbon. (Terms in red signify a "Vocabulary Alert" in the margin of the text.) When a star nears the end of its life, it loses much of its material back into space—including some of these more massive atoms. This material combines with material lost from other stars, some of which produced even more massive atoms as they exploded, to form large clouds of dust and gas. Those clouds go on to make new stars and planets, like our Sun and Solar System. Prior "generations" of stars supplied the building blocks for the chemical processes, such as life, that go on around us (Figure 1.3). Look around you. Everything you see is made of atoms that were formed in stars long ago.

While you're reading the ebook, vocabulary words will appear in red text. Click on the vocabulary word to show a brief definition. Click any open space in the ebook to close the definition window.

Detailed Concepts

Working It Out 1.1 | **Units and Scientific Notation** SHOW

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Detailed concepts, separated from the text inside a hidden box (above), can be displayed by clicking anywhere in the box. The detailed concept can then be hidden again by click the header of the open box (below).

Working It Out 1.1 | **Units and Scientific Notation**



HIDE

Mathematics is the language of patterns, and the universe “speaks” math. If you want to ask questions about the universe and understand the answers, you have to speak math too. Throughout the text, we present the math as needed, with worked examples to help you understand how to work it out on your own. We begin with two essential pieces: units, which relate numbers to the physical quantities they represent, and scientific notation, which makes it possible to express compactly the extremely large numbers that are common in astronomy.

Multimedia Resources

 **Astronomy in Action:** The Cause of Earth's Seasons

 **AstroTour:** The Celestial Sphere and the Ecliptic

 **Nebraska Simulation:** Seasons and Ecliptic Simulator

Various multimedia resources may be available in your ebook (some examples are above). Click on the multimedia icon or title to view the resources. To return to the ebook, click on the back button on your Internet browser window.

Page Numbers



p. 62

| **3.5 Orbits Are One Body “Falling Around” Another**

Kepler’s laws regarding the motions of planets allowed astronomers to predict the positions of the planets accurately, but these laws did not explain why the planets behaved as they did. Newton’s work provided the answer to the question: Why do planets orbit the Sun?

Pages numbers that correspond to the page numbers in the printed textbook can be found in the left margin of the ebook.