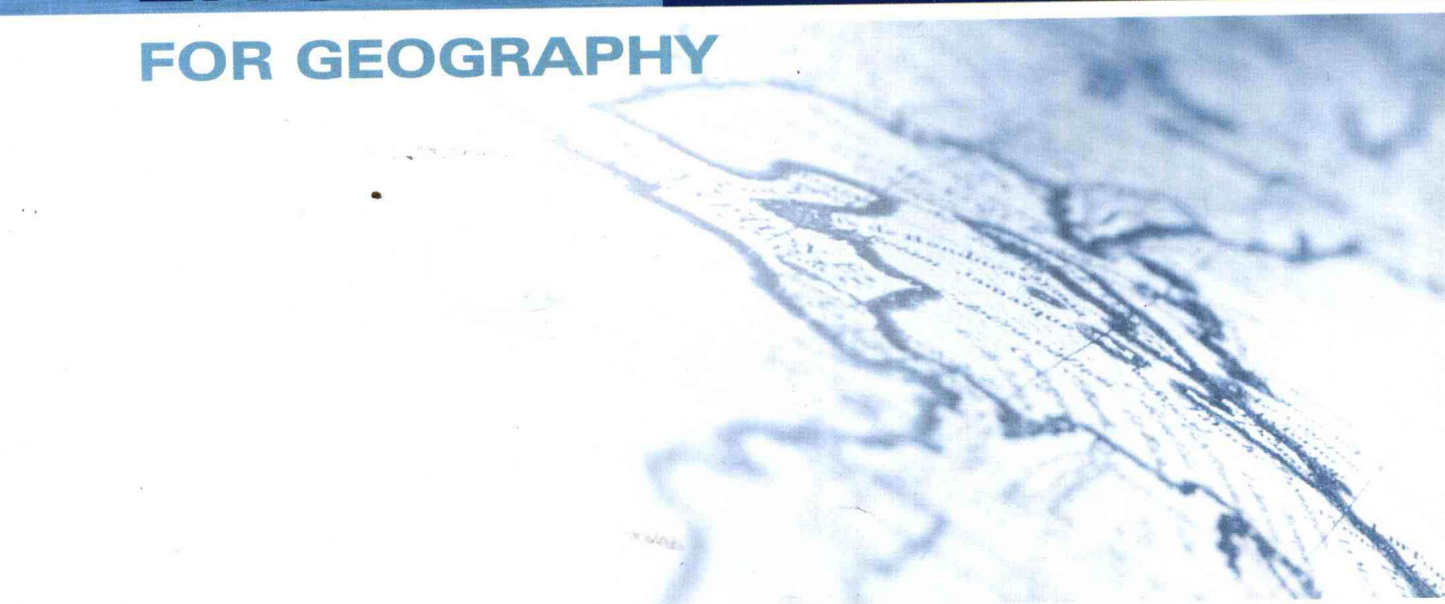
高等学校专业英语系列教材

地理专业英语

ENGLISH FOR GEOGRAPHY

余中元 主编



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前　言

《大学英语教学大纲》（修订本）明确规定："学生在完成基础阶段的学习任务，达到四级或六级后，都必须修读专业英语，掌握 1 000~1 500 个本专业及与本专业有关的常用单词，能顺利阅读有关专业的原版教科书、参考书及其他参考资料，能用英语写论文摘要和论文简介等，能借助词典将有关专业的英语文章译成汉语和汉语文字材料译成英语。"地理专业英语是学生在大学公共英语的基础上以所学专业为方向的进一步的英语学习。

就笔者所知，目前国内还没有一本正式的地理专业英语教材，与地理专业英语有关的教材，仅见上海外语教育出版社出版的《地理学专业英语基础》（图示教程），以图示的形式展示地理词汇，内容有些繁杂，不够系统，也没有配套练习，是适合大学生课外阅读和学生自学的自修教材。没有正式的专业英语教材，学生在专业英语学习中普遍感到困惑，教师也感到难以规范自己的教学，不好把握教学要求、教学进度、教学质量和教学内容。国内急需一套内容全面、语言地道的专业英语教材和读物。

本书系统性较强。从教材内容来看，本书涉及自然地理学、人文地理学、技术地理学等各方面的知识。包含天文学基础、地球概论、气象与气候、土壤、植被、水文地质地貌等自然地理学知识；城市规划、区域结构、城市结构模式、旅游地理、人口地理、资源、环境、自然灾害等人文地理知识；可持续发展、资源危机、环境保护、全球意识等人地相关知识和可持续发展思想；地图、遥感、地理信息系统等地理技术、信息技术科学知识。突出了地理学发展的人文趋势，强调了环境教育、灾害教育和可持续发展思想及和谐社会思想的教育。

本书结构合理。全书共选择了 36 篇文章，所选文章均来自于国外地理专家的有关文献或网上发表的最新的文章，具有代表性，语言科学地道、专业。其中，讲读课文 16 篇，其余安排为阅读课文，供老师上课选择和学生拓展知识、增加词汇、强化训练和课后阅读用。每单元前面有知识背景介绍，概览本单元所涉及的知识领域，把学生带入即将学习的情景中。并设有 Warm Up，让学生用英语思考或探讨本单元即将学习的内容。在课文后设有生词和词组 Words and Expressions、注释 Notes 和练习 Exercises（包含阅读、词汇、翻译三项）。阅读课文 Reading Material 后设有读后讨论或思考，对所读内容进行理解升华和检验，对相关专业知识进行回顾。本书后设有课文的参考译文和练习的参考答案，供教师备课、上课和学生学习参考。

本书注重学生专业英语实际能力的培养与实战练习。在讲读课文里，Words and Expressions 部分对新的专业词汇进行释义和注音，Notes 部分包含语法解疑、疑难句剖析、学术问题探讨、

前沿观点介绍、翻译技巧探讨，帮助学生理解课文。教材通过大量的练习和大容量的阅读扩大学生词汇量，提高其阅读能力、写作能力和翻译能力。在阅读理解部分设有回答问题、判断正误、概括段意、填写表格、多项选择等练习题，对课文进行多角度、全方位、多形式的理解训练，对专业知识进行较好的归纳和回顾。词汇部分设有词义连线、词汇词组填空等练习题，巩固所学生词和有用的词组。翻译部分设有汉译英和英译汉两种形式的习题。各部分的练习题材新颖，具有概括性，旨在培养学生运用专业英语词汇进行遣词造句、连句成篇及英汉互译、专业英语写作的能力。

通过地理专业英语教材的学习，学生可以扩大专业词汇量，提高地理专业英语阅读、写作、翻译等各方面的能力，能初步运用英语与国外学者进行书面的和口头的学术交流。本教材的学习能够推动地理教学和地理研究的国际化，为高校正在开展的地理专业双语教学奠定基础，为学生今后进行地理科学研究查阅外文文献、写作外文论文或外文摘要打下基础，也为部分学生赴国外进一步深造打下基础。

本书可作为大学地理相关专业、地理成人教育的专业英语教材，也可以作为地理双语教学的参考教材，还可以作为中学地理老师、地理工作者、出国留学人员、地理业余爱好者的自学教材和参考用书。

编　者

于海南师范大学怡园

2008 年 12 月

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UNIT 1 The Earth and the Universe

Background

学习地理，需要懂得地球的宇宙环境。本单元介绍太阳系、宇宙的起源、地球的演化历史和月球的有关知识。学习本单元要有一定的想象力。

太阳系是银河系的成员，银河系与河外星系构成总星系，也就是目前人们所知的宇宙。银河系是个旋臂状的碟形，包含有 2 000 亿颗恒星。太阳位于其中的一个旋臂上。太阳最近的恒星邻居是距其 4.3 光年的比邻星。整个太阳系围绕着银河系的中心旋转。太阳系的行星有 8 个：水星、金星、地球、火星、木星、土星、天王星、海王星。根据国际天文学联合会大会于 2006 年 8 月 24 日在布拉格投票通过的新的行星定义，冥王星被编入“矮行星”。此外，太阳系还包括：行星的卫星、许多的彗星、小行星和流星体以及行星际物质。行星、大多数行星的卫星和小行星都以相同的方向、接近圆形的轨道围绕太阳转动。大多数行星的自转轴与黄道面垂直。

太阳系的行星可以分为类地行星和类木行星两类。类地行星是离太阳最近的四个恒星：水星、金星、火星、地球。它们具有像地球一样的高密度的岩石地表，因而得名。金星、地球、火星具有较浓的大气，而水星却几乎没有。木星、土星、天王星、海王星是类木行星（与木星相似）。

宇宙大爆炸理论认为我们的宇宙曾有一段从热到冷的演化史。在这个时期里，宇宙体系并不是静止的，而是在不断地膨胀，使物质密度从密到稀地演化。这一从热到冷、从密到稀的过程如同一次规模巨大的爆炸。根据大爆炸宇宙学的观点，大爆炸的整个过程是：早期的宇宙温度极高，在 100 亿摄氏度以上。物质密度也相当大，整个宇宙体系达到平衡。宇宙间只有中子、质子、电子、光子和中微子等一些基本粒子形态的物质。当温度降到几千摄氏度时，辐射减退，宇宙间主要是气态物质，气体逐渐凝聚成星云，再进一步形成各种各样的恒星体系，成为我们今天看到的宇宙。

月球是地球唯一的天然卫星，是距离我们最近的天体，它与地球的平均距离约为384 401 km。它的平均直径约为3 476 km，比地球直径的1/4稍大些。月球的质量约7 350亿亿吨，相当于地球质量的1/81，月面重力则差不多相当于地球重力的1/6。月球本身不发光，只反射太阳光。它的亮度和圆缺随日月间角距离和地月间距离的改变而变化，月相也因此而产生，满月时亮度平均为–12.7星等。

月球上有丰富的自然资源和独特的自然环境，为人类的太空探索、生物研究、资源开发和空间利用提供了有利条件。

1959年，苏联发射的“月球1号”飞船飞到月球附近，进行绕月飞行，开始了人类对月球的考察。1969年7月20日，“阿波罗”登月舱降落到月面，开始了人类有史以来的登月活动。到了1972年，人类先后登月6次，进行了一系列的科学考察，人类对月球的认识更加全面、深入。2007年10月24日18时5分，我国在西昌卫星发射中心用“长征三号甲”运载火箭将“嫦娥一号”卫星成功送入太空，我国进入探月的攻坚时期。

Warm Up

1. What is the difference between terrestrial planets and jovian planets in solar system?
2. Describe the world on the Moon.
3. How does the universe evolve?
4. Why are people interested in the moon exploring?

Text

Solar System

Our solar system began forming about 5 billion years ago as gas clouds coalesce into planets and a star. Today, the solar system contains eight commonly recognized planets and the Sun. (**Source:** NASA)

Solar system consists of an average star we call the Sun, the planets Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune (Figure 1T-1). It includes: the satellites of the planets; numerous comets, asteroids, and meteoroids; and the interplanetary medium. The Sun is the richest source of electromagnetic energy (mostly in the form of heat and light) in the solar system. The Sun's nearest known stellar neighbor is a red dwarf star called Proxima Centauri, at a distance of 4.3 light years away. The whole solar system, together with the local stars visible on a clear night, orbits the

center of our home galaxy, a spiral disk of 200 billion stars we call the Milky Way. The Milky Way has two small galaxies nearby, which are visible from the southern hemisphere. They are called the Large Magellanic Cloud and the Small Magellanic Cloud. The nearest large galaxy is the Andromeda Galaxy. It is a spiral galaxy like the Milky Way but is 4 times as massive and is 2 million light years away. Our galaxy, one of billions of galaxies known, is traveling through intergalactic space.

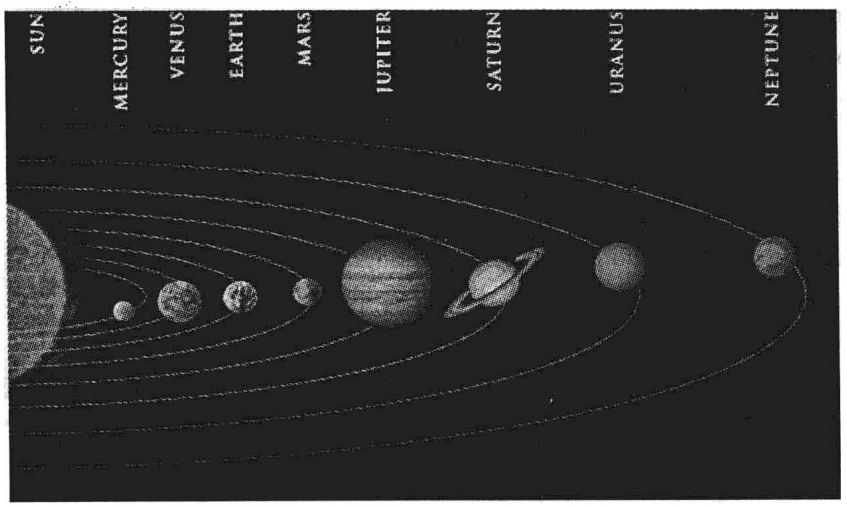

Figure 1T-1

The planets, most of the satellites of the planets and the asteroids revolve around the Sun in the same direction, in nearly circular orbits. When looking down from above the Sun's north pole, the planets orbit in a counter-clockwise direction. The planets orbit the Sun in or near the same plane, called the ecliptic.

Composition of the Solar System

The Sun contains 99.85% of all the matter in the Solar System. The planets, which condensed out of the same disk of material that formed the Sun, contain only 0.135% of the mass of the solar system. Jupiter contains more than twice the matter of all the other planets combined. Satellites of the planets, comets, asteroids, meteoroids, and the interplanetary medium constitute the remaining 0.015%.

The Terrestrial Planets

The terrestrial planets are the four innermost planets in the solar system, Mercury, Venus, Earth and Mars. They are called terrestrial because they have a compact, rocky surface like the Earth's. The planets, Venus, Earth, and Mars have significant atmospheres while Mercury has almost none. The following diagram (Figure 1T-2) shows the approximate distance of the terrestrial planets to the Sun.

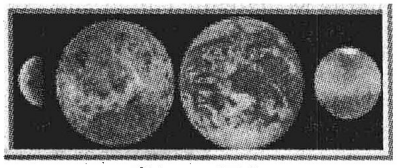

Figure 1T-2

The Jovian Planets

Jupiter, Saturn, Uranus, and Neptune are known as the Jovian (Jupiter-like) planets, because they are all gigantic compared with Earth, and they have a gaseous nature like Jupiter's. The Jovian planets are also referred to as the gas giants, although some or all of them might have small solid cores. The following diagram (Figure 1T-3) shows the approximate distance of the Jovian planets to the Sun.

Figure 1T-3

The following table lists statistical information for the Sun and planets:

Table　Statistical information for the Sun and planets

	Distance (AU)	Radius (Earth's)	Mass (Earth's)	Rotation (Earth's)	Moons	Orbital Inclination	Orbital Eccentricity	Obliquity	Density (g/cm^3)
Sun	0	109	332 800	25 ~ 36	9				1.410
Mercury	0.39	0.38	0.05	58.8	0	7	0.205 6	0.1°	5.43
Venus	0.72	0.95	0.89	244	0	3.394	0.006 8	177.4°	5.25
Earth	1.0	1.00	1.00	1.00	1	0.000	0.016 7	23.45°	5.52
Mars	1.5	0.53	0.11	1.029	2	1.850	0.093 4	25.19°	3.95
Jupiter	5.2	11	318	0.411	16	1.308	0.048 3	3.12°	1.33
Saturn	9.5	9	95	0.428	18	2.488	0.056 0	26.73°	0.69
Uranus	19.2	4	17	0.748	15	0.774	0.046 1	97.86°	1.29
Neptune	30.1	4	17	0.802	8	1.774	0.009 7	29.56°	1.64

The Sun's period of rotation at the surface varies from approximately 25 days at the equator to 36 days at the pole. Deep down, below the convective zone, everything appears to rotate with a period of 27 days.

Words and Expressions

Jupiter	['dʒu:pitə]	n. 木星
Saturn	['sætən]	n. [天]土星，土星火箭
Uranus	['juərənəs]	n. 天王星
Neptune	['neptju:n]	n. 海王星
Pluto	['plu:təu]	n. 冥王星，阴间之神
comet	['kɔmit]	n. 彗星
asteroid	['æstərɔid]	n. [天文]小游星，小行星 adj. 星状的
meteoroid	['mi:tiərɔid]	n. 流星体
interplanetary medium	[ˌintə'plænitəri'mi:diəm]	行星际物质
electromagnetic	[iˌlectrəumægn'etik]	adj. 电磁的
dwarf star	[dwɔ:f]	矮星
Proxima Centauri	['proksimə'sentɔ:]	n. [天](半人马座)比邻星 (亦作 Proxima Centauri)
the Large Magellanic Cloud	[mægə'lænik]	大麦哲伦星云
The Andromeda Galaxy	[æn'drɔmədə]	仙女座星系
intergalactic space	[intəgə'læktik]	星系际空间
ecliptic	[i'kliptik]	n. [天]黄道 adj. 黄道的，日(或月)食的，蚀的
the Jovian Planet	['dʒəuviən]	类木行星
the terrestrial planet	[tə'restriəl]	类地行星
Milky Way		银河
counter-clockwise		逆时针
light year		光年
innermost	['inəməust]	adj. 最里面的，内心的，秘密的

Notes

1. 文章来源于 http://www.physicalgeography.net/fundamentals/1b.html。

2. Solar system consists of an average star we call the Sun, the planets Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune。太阳系由一个我们称之为太阳的普通恒星和八大行星——水星、金星、地球、火星、木星、土星、天王星和海王星组成。consist of 包含。an average star we call the Sun，we 前省略了 that, that 引导定语从句修饰 star。the planets Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune 是同位语结构。

2006 年 8 月 24 日国际天文学联合会大会在布拉格投票通过新的行星定义，冥王星被“逐出”行星行列，而被编入“矮行星”。由此，太阳系包括行星、矮行星和太阳系小天体。行星指围绕太阳运转，自身引力足以克服其刚体力而使天体呈圆球状，并且能够清除其轨道附近其他物体的天体。太阳系行星包括水星、金星、地球、火星、木星、土星、天王星和海王星八个。矮行星与行星同样具有足够的质量，呈圆球状，但不能清除其轨道附近其他物体的天体，包括冥王星和谷神星等。太阳系小天体指围绕太阳运转但不符合行星和矮行星条件的物体。

3. The Sun is the richest source of electromagnetic energy (mostly in the form of heat and light) in the solar system. The Sun's nearest known stellar neighbor is a red dwarf star called Proxima Centauri, at a distance of 4.3 light years away. 太阳是太阳系最丰富的电磁能量来源（几乎都以光和热的形式存在）。太阳最近的恒星邻居是距其 4.3 光年的红矮星半人马座的比邻星。electromagnetic 电磁的，是复合词。

4. 红矮星（red dwarf）是指表面温度低、颜色偏红的矮星，尤指主序星中比较“冷”的 M 型。过去把恒星分为巨星和矮星。

5. The nearest large galaxy is the Andromeda Galaxy. It is a spiral galaxy like the Milky Way but is 4 times as massive and is 2 million light years away. 隔得最近的大星系是仙女座。她像银河一样是旋臂状星系，但其质量是银河系的 4 倍，距离我们也有 20 亿光年之远。4 times as massive，其后省略了 as the Milky Way is。

6. When looking down from above the Sun's north pole, the planets orbit in a counter-clockwise direction. 当从太阳系的北极向下俯视的时候，我们发现行星公转的轨道是逆时针方向。look down from 从……向下俯视。counter-clockwise 逆时针方向，顺时针方向是 clockwise。

7. The Sun contains 99.85% of all the matter in the Solar System. The planets, which condensed out of the same disk of material that formed the Sun, contain only 0.135% of the mass of the solar system. 太阳系中，太阳拥有所有质量的 99.85%。行星由与太阳系的构成物质相同的星云盘物质浓缩而成，却只有太阳系 0.135% 的质量。句中 which 引导非限制性定语从句。

8. The Sun's period of rotation at the surface varies from approximately 25 days at the equator to 36 days at the poles. 太阳表层从赤道到两极自转的周期大约从 25 天到 36 天不等。

太阳是气体球，各地自转周期不等。太阳在赤道部分自转最快。

Exercises

Reading Comprehension

Ⅰ. Say whether the following statements are true (T) or false (F) according to the text.

1. Our solar system began forming about 5 billion years ago as gas clouds coalesced into planets and a star. ( )

2. The Milky Way has two small galaxies nearby, Proxima Centauri and Andromeda Galaxy, which are visible from the southern hemisphere. ( )

3. The Sun's nearest known stellar neighbor is a red dwarf star called Proxima Centauri, at a distance of 4.3 light years away. ( )

4. Neptune is a special case in that its orbit is the most highly inclined (18 degrees) and the most highly elliptical of all the planets. ( )

5. The exceptions are Uranus and Pluto, which are tipped towards the Sun. ( )

6. The terrestrial planets are the four innermost planets in the solar system, Mercury, Venus, Earth and Mars. ( )

7. The Jovian planets are also referred to as the gas giants, because they are made up of gases completely. ( )

8. The Sun's period of rotation at the surface varies from approximately 25 days at the poles to 36 days at the equator. ( )

Ⅱ. Answer the following questions according to the text.

1. What is the Sun's nearest known stellar neighbor? How far is it?
2. Why is, for part of its orbit, Pluto closer to the Sun than Neptune?
3. Why do we call Mercury, Venus, Earth and Mars terrestrial planets?
4. Why does the Sun's period of rotation at the surface vary from the equator to the poles?
5. What are the differences between the Terrestrial Planets and the Jovian Planets?

Ⅲ. Complete the table bellow according to the text.

	members	surface	density	satellites	temperature
the terrestrial planets					
the Jovian planets					

Vocabulary

Ⅰ. Match the words in Column A with their corresponding definition of descriptions in Column B.

A	B
1. asteroids	a. object that moves round the sun and looks like a bright star with a long, less bright tail
2. comets	b. any of many small planets revolving round the Sun, esp between the orbits of Mars and Jupiter
3. the Milky Way	c. small mass of matter that enters the earth's atmosphere from outer space, making a bright streak across the sky as it is burnt up
4. meteoroids	d. the system of stars that contains our solar system, seen as aluminous band in the sky
5. ecliptic	e. the apparent path of the Sun's motion on the celestial sphere as seen from the Earth

Ⅱ. Complete the following sentences with the words given below, changing the forms where necessary.

intergalactic	counter-clockwise	orbit	coalesce into
looking down	ecliptic	refer to as	Milky Way

1. Our solar system began forming about 5 billion years ago as gas clouds _____ planets and a star.

2. The whole solar system, together with the local stars visible on a clear night, _____ the center of our home galaxy, a spiral disk of 200 billion stars we call the _____.

3. Our galaxy, one of billions of galaxies known, is traveling through _____ space.

4. When _____ from above the Sun's north pole, the planets orbit in a _____ direction.

5. The planets orbit the Sun in or near the same plane, called the _____.

6. The Jovian planets are also _____ the gas giants, although some or all of them might have small solid cores.

Translating

Ⅰ. Translate the following paragraph into Chinese.

The Moon, of course, has been known since prehistoric times. It is the second brightest object in the sky after the Sun. As the Moon orbits around the Earth once per month, the angle between the

Earth, the Moon and the Sun changes; we see this as the cycle of the Moon's phases. The time between successive new moons is 29.5 days (709 hours), slightly different from the Moon's orbital period (measured against the stars) since the Earth moves a significant distance in its orbit around the Sun in that time.

Ⅱ. Translate the following paragraphs into English.

太阳系八大行星中，一般把水星、金星、地球和火星称为类地行星，它们的共同特点是其主要由石质和铁质构成，半径和质量较小，但密度较高。把木星、土星、天王星和海王星称为类木行星，它们的共同特点是其主要由氢、氦、冰、甲烷 (methane)、氨 (ammonia) 等构成，石质和铁质只占极小的比例，它们的质量和半径均远大于地球，但密度却较低。冥王星是一颗特殊的星体，是矮行星。

太阳系是由受太阳引力 (gravitation) 约束的天体组成的系统，它的最大范围约可延伸到 1 光年以外。太阳系的主要成员有：太阳（恒星）、八大行星（包括地球）、无数小行星、众多卫星（包括月亮），还有彗星、流星体以及大量尘埃物质和稀薄的气态物质。在太阳系中，太阳的质量占太阳系总质量的 99.8%，其他天体的总和不到太阳的 0.2%。太阳是中心天体，它的引力控制着整个太阳系，使其他天体绕太阳公转。太阳系中的八大行星（水星、金星、地球、火星、木星、土星、天王星、海王星）都在接近同一平面的近圆轨道上朝同一方向绕太阳公转。

*R*eading Material A

Evolution of the Universe

About 11 to 15 billion years ago all of the matter and energy in the Universe was concentrated into an area the size of an atom. At this moment, matter, energy, space and time did not exist. Then suddenly, the Universe began to expand at an incredible rate and matter, energy, space and time came into being (the Big Bang). As the Universe expanded, matter began to coalesce into gas clouds, and then stars and planets. Our solar system formed about 5 billion years ago when the Universe was about 65% of its present size. Today, the Universe continues to expand.

Why Do Most Scientists Accept the Big Bang Theory?

The acceptance of this theory by the scientific community is based on a number of observations. These observations confirm specific predictions of the ***Big Bang*** theory. We learned that scientists test their theories through deduction and falsification. Predictions associated with the ***Big Bang*** theory that have been tested by this process are:

1. If the Big Bang did occur, all of the objects within the Universe should be moving away from each other. In 1929, Edwin Hubble documented that the galaxies in our Universe are indeed moving away from each other.

2. The Big Bang should have left an "afterglow" from the explosion. In the 1960s, scientists discovered the existence of ***cosmic background radiation***, the so-called "afterglow" after the Big Bang explosion. Our most accurate measurements of this cosmic radiation came in November 1989, by the Cosmic Background Explorer (COBE) satellite. The measurements from this satellite tested an important prediction of the ***Big Bang*** theory. This prediction suggests that the initial explosion that gave birth to the Universe should have created radiation with a spectrum that follows a blackbody curve. The COBE measurements indicated that the spectrum of the cosmic radiation varied from a blackbody curve by only 1%. This level of error is considered insignificant.

3. If the Universe began with a Big Bang, extreme temperatures should have caused 25 percent of the mass of the Universe to become helium. This is exactly what is observed.

4. Matter in the Universe should be distributed homogeneously. Astronomical observations from the Hubble Space Telescope do indicate that matter in the Universe generally has a homogeneous distribution.

How Will the Universe End?

Cosmologists have postulated two endings to the Universe. If the Universe is infinite or has no edge, it should continue to expand forever. A Universe that is finite or closed is theorized to collapse when expansion stops because of gravity. The collapse of the Universe ends when all matter and energy is compressed into the high energy, high-density state from which it began. This scenario is of course called the Big Crunch. Some theorists have suggested that the Big Crunch will produce a new Big Bang and the process of an expanding Universe will begin again. This idea is called the ***oscillating Universe theory.***

Early History of the Earth

Scientists believe the Earth began its life about ***4.6 billion*** years ago. The Earth formed as cosmic dust lumped together to form larger and larger particles until 150 million years had passed. At about 4.4 billion years, the young Earth had a mass similar to the mass it has today. The continents probably began forming about 4.2 billion years ago as the Earth continued to cool. The cooling also resulted in the release of gases from the lithosphere, much of which formed the Earth's early atmosphere. Most of the Earth's early atmosphere was created in the first one million years after solidification (4.4 billion years ago). Carbon dioxide, nitrogen, and water vapor dominated this