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中学地理专业基础英语教程

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前　言

20 世纪 90 年代以来，我国基础教育领域广泛开展了学科双语教学，急需大量中小学双语教师，高等师范院校理应承担起为中小学培养优秀双语教师的任务。迄今为止，我国高等师范院校中从未设立双语教学专业，现有的双语教师也基本上没有接受过专门的系统的双语教学培训，因此，编写双语师资培养的相关教材势在必行。

本书按照中学地理教学大纲要求，选取相应的英语文献资料进行统一编排，使学生掌握地理专业知识的英语表达方法，着重提高学生的地理专业英语的综合运用能力，为学生将来从事中小学地理双语教学工作做好必要的准备。全书共八章，包括宇宙中的地球、大气、海洋、地形、人类生产活动、人口与城市、交通运输、可持续发展等内容。长春师范学院承担本教材的编写工作，具体分工如下：关英敏第一、二、三、四章，杨淼玲第五、六、七章，董炜华第八章，最后由关英敏统稿和定稿。

本书的编写力求适应中学地理双语师资培养的要求，为相关专业领域的师生服务。由于我们的编写水平有限，本书中一定有许多不妥之处，敬请各位同行和广大读者批评指正。

编　者

2011 年 6 月

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Unit 1 The Universe Environment

Lesson 1 The Universe that Humans Know

Goal

1. 知识目标：

（1）初步了解地球的宇宙环境，理解天体系统的层次，知道地球在宇宙中的位置。

（2）知道太阳系的成员，运用资料认识八大行星绕日公转的运动特质、结构特质，从中说明地球是太阳系中一颗既普通又特殊的行星。

（3）理解地球上出现生命的原因。

（4）识记天体系统和太阳系行星各类词汇。

2. 能力目标：

（1）能运用图表形象掌握太阳系的主要成员，分析说明地球的普通性与特殊性。

（2）能利用太阳系模式图分析日地关系，理解地球上存在生命的条件。

3. 情感目标：

（1）通过了解地球所处的宇宙环境，树立科学的宇宙观。

（2）通过认识地球是太阳系中一颗即普通又特殊的行星，确立任何事物的发展都有其普遍性和特殊性的观点；通过运用资料探讨地理问题，形成实事求是的科学态度。

New words and expressions

star 恒星
nebula 星云
comet 彗星
celestial body 天体
planet 行星
satellite 卫星
meteoroid 流星体
Mercury 水星
Venus 金星
Mars 火星
Jupiter 木星
Saturn 土星
Uranus 天王星
Neptune 海王星
Pluto 冥王星
the solar system 太阳系
the Galaxy 银河系
extragalactic system 河外星系
metagalaxy 总星系

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light-year 光年
Copernicus 哥白尼
the heliocentric theory 日心说

Reading

The Universe that Humans have Observed At Present

Human beings have recognized the universe for a long time. The astronomical universe discussed in ancient natural philosophy is no more than the earth and heaven. In the 16th century, Copernicus proposed the heliocentric model of the universe. He believed the sun was the center of the universe. That means the universe is actually the solar system. In the 1800s, astronomers introduced the word "Galaxy" and in some sense, it meant the same as the word universe. Since the 20th century, particularly the 1960s, with the use of large telescopes and the progress of space technology, the scale of astronomical knowledge has extended to more than 10 billion light years and reach back more than 10 billion light years. Thus, people's knowledge of the universe has increased.

The universe is a physical world, and it has different forms. On a clear night, with naked eyes or with the help of a telescope, we can see the gleaming stars, moving planets, and the moon changing between full and new cycles. Some times, we can also see nebulae with vague outlines, meteors flashing, trailing comets. We can also observe the gas and dust of interstellar space with the help of astronomical telescopes and other space surveying methods. All these are called celestial bodies, which are different in their size, mass, brightness, and

temperature, etc.

The universe is in unceasing movement and development all the time. Stars and planets attract and turn around each other, forming the celestial star system. By now, the celestial star systems that humans have recognized rank from small to large.

1. The moon revolves around the earth, and they form the earth-moon system. The average distance from the earth to the moon is 384 thousand kilometers.

2. The planets such as Earth, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto and other celestial bodies, such as small planets, comets, meteors, etc, all revolve around the sun. They form the solar system. The sun is the central celestial body of the solar system. It makes up 99.86% of the total mass of the solar system. Pluto is the farthest planet from the sun. Its orbit diameter is about 12 billion meters.

3. The sun and thousands of other stars form a huge star group, which is called the Milky Way Galaxy. There are 200 billion stars like the sun in the Milky Way Galaxy. The diameter of the main body of the Milky Way Galaxy is 80 thousand light years.

4. There are many other celestial bodies that have the same size as the Milky Way Galaxy. They are called the Extragalactic Galaxies, or galaxies for short. At present, with the largest telescope, we can observe billions of galaxies. The farthest one is about 15 to 20 billion light years away from earth. The Milky Way Galaxy and the other galaxies that have been observed are together called the metagalaxy. This is the universe range we can observe now.

Celestial bodies in the universe were not formed at the same time. They all had their own origin, development and decline. As a whole, the universe has developed from high temperature to low temperature,

and from high density to low density.

The Earth in the Universe

The earth is one of the planet of the solar system. The distance between the sun and the earth is 149.6 million kilometers.

The earth is a common planet in the solar system. Among the 8 big planets of the solar system, the earth has its own characteristics in mass, volume, mean density, revolution and rotation, which are uncommon among all the planets.

But the earth is special because it is a planet suitable for living things to live and reproduction. We believe there are other celestial bodies where living things can survive too, but until now, they have not been discovered. Why do living things emerge on the earth? This answer is closely related to the special location of earth in the solar system and the conditions on earth.

It has been a long time from the beginning of the solar system to the appearance of primitive living things. In this period of time, the sun changed little. The earth received steady sunshine. The living things evolved without interruption from low to high stages of development.

In interplanetary space, near the earth, big or small planets turn around the sun in the same direction, and in nearly the same orbital plane. Big or small planets all have their own paths and do not intersect with one another. This allows the earth stay in a secure universe environment.

The distance from the earth to the sun is moderate. This makes the average temperature of the earth's surface remain about 15℃. It is useful for the origin and development of living things. If the distance had been too small, the temperatare would have been too high, so the heat would have stopped the atoms joining together. It would have been impossible for molecules to form, to say nothing of complicated living things. If the distance had been too large, the temperature would have been too low

for the molecules to combine together in a solid or crystal shape. The living things would not have survived.

The volume and mass of the earth is moderate. The earth's gravity gathers a large amount of gas around the earth. The gas forms the atmosphere, which wraps up the earth. But the early atmosphere lacked oxygen. It was mainly composed of carbon dioxide, carbon monoxide, methane and ammonia. After a long period of evolution, the atmosphere gradually became composed of nitrogen and oxygen, and became suitable for living things to breath.

Both the decay of radioactive elements inside the earth that generated heat and the gravitational contraction of the original earth caused the inner earth's temperature to increase. The crystalline water turned to gas. The inner earth's activities, such as volcanic eruptions, accelerated the loss of water vapor from the earth's interior. As the temperature of the earth's surface gradually fell, water vapor gathered by condensation and rainfall. Eventually, it formed the proto-ocean. Primitive one-celled organisms on the earth came from the ocean.

So, the earth is a steady and secure environment, and the earth itself has the essential conditions necessary for the survival of organisms. These are temperature, atmosphere, water and so on. So, there is no wonder that living things came forth and evolved.

Post-reading

1. Describe the hierachical celestial system in the universe.
2. How do the planets revolve around the Sun?
3. Describe the composition of the Solar System.
4. Why did living things emerge on the earth? (The answer is

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closely related to where the earth is, and the conditions on the earth.)

Integrating skills

1. If we have an accurate understanding of the earth place in space, we will reject blindness and superstition, which can be hurt our society. What is your opinion?

2. Take good care of the earth, because we have only one earth. Say something about it.

3. Manycountries plan to land on the moon again. Tell us your opinion about this.

4. Spaceflight technology is entering the open market, business competition is becoming more and more drastic, this has been shown in the launching of satellites. What is your view?

Lesson 2 The Relationship among the Sun, the Moon and the Earth

Goal

1. 知识目标:

(1) 了解太阳能量的来源、太阳辐射及其对地球和人类的影响。

(2) 理解太阳黑子和耀斑的形成原因及其对地球的影响。

(3) 了解日、地、月三者的关系及月相变化的规律。

2. 能力目标：

学会运用相关图表，并能理论与实际相结合来综合分析和解决问题。

3. 情感目标：

通过日、地、月三者关系的学习，使学生树立一个事物之间是相互联系、相互影响的辩证思想观点。

New words and expressions

solar radiation 太阳辐射
solar activity 太阳活动
sunspot 太阳黑子
solar flare 耀斑
phases of the moon 月相

Reading

The Impact of Solar Radiation on the Earth

The sun is a massive ball of hot gas. Its principal constitures are hydrogen and helium. The temperature of its surface is about 6 000K. The sun continuously releases energy outward in all directions in the form of electromagnetic waves. This is called solar radiation. Solar radiation is enormous. It can be calculated that solar radiation traversed to the earth each minute is proximately equivalent to the quantity of heat generated by burning 400 million tons of coal.

Solar radiation comes from nuclear fusion reaction in the sun's

interior. Under the high temperature and high pressure in the sun's interior, four hydrogen nuclei are joined to form one helium nucleus through a chain of nuclear fusion reactions. In the process of nuclear fusion reaction, a loss happens in the nucleus mass. This loss in mass changes into energy. Because of nuclear fusion, the mass that the sun loses in one second is about four million tons. At such a rate, the sun has only lost 0.03% of its mass in the last 5 billion years.

Only one two-billionth of total solar radiation reaches the earth, but it is critical to the earth and to human beings.

1. Solar radiation is the main power that keeps the temperature of the earth's surface constant and maintains the activities and development of water, air, and biology. For instance, the latitude at which solar radiation hits the earth's surface is different at different latitudes. On the earth's surface, the heat is in balance. So the heat is transferred between those regions with too much and those regions with too little. The heat on the earth is transferred by the movement of air and water. This air and water movement are atmospheric circulation and oceanic circulation. They are important in the formation and development of the geographical environment.

2. Solar radiation is the energy source of our ordinary life and production. For instance, people directly generate electricity by using solar radiation. People regard fossil fuels as the most important way to make energy. These include coal and oil, which accumulated huge amunt of solar radiation when they were formed.

China is one of the first countries to use solar energy. In some agricultural or pastoral areas with abundant solar radiation, people make food with solar stoves, process agricultural products with solar dryers. and even watch TV by electric power generated from solar radiation.

The Solar Activity Impact on the Earth

The sun we can observe directly is the solar atmosphere. It is divided into three layers: photosphere, chromosphere, and corana. The solar atmosphere changes frequently and even dramatically. These changes are totally called solar activities.

1. The main types of solar activity.

Solar activity has many types, among them sunspots and flams are the most prominent.

(1) The solar photosphere often has dark spots. These spots are called sunspots. Sunspots are not actually dark. It is only because their temperature is lower than elsewhere on the solar surface, that they look a little darker. According to records, sunspots occur more in some years, and less in others. The cycle of the change is about 11 years. Usually, the places and time that sunspots seem to occur to coincide with other solar activities, such as flares. So the number and size of the sunspots indicate the intensity of solar activities.

(2) Sometimes, suddenly enlarging and brightening spots emerge on the solar chromosphere. These are called flares. From the beginning to the upsurge, flares last about a few minutes to dozens of minutes. During that time, they give off the energy equivalent to 10 billion million tons H-bombs. They emit very strong radio waves, very large amounts of ultraviolet rays, x-rays, r-rays, and high-energy electronic particles. So flares are the symbol of the strongest solar activity.

2. The solar activity impact on the earth

The following example show how solar activity affects the earth.

(1) Effect on the earth climate: by far, the relationship between solar activity and the earth's climate hasn't been discovered, but statistics show they are related. For example, the annual variation of rainfall in many parts of the world is affected somehow by the cycle of sunspots .

(2) Influence on the earth's ionosphere. When flares occur, the sun emits electromagnetic waves, which enter the earth ionosphere and causes the disturbance of the ionosphere. During that time, short-wave radio signals transmitted in the ionosphere are partly or totally absorbed, and this can interfere with communications. For example, the dozens of flares that occurred in March 1989 resulted in short-wave transmission partly stopping 15 times and stopping altogether 24 times.

(3) Effect on the earth's magnetic field. There is a magnetic field on the earth. When solar activities are in full swing, the sun ejects an electronic particle flow, which upsets the earth's magnetic field, produces a magnetic storm, and causes the magnetic needles of a compass to flicker violently and behave erratically.

Because solar activities affect the earth tremendously, all countries around the world pay much attention to the survey and forecasting of the sun activities. In this way, related departments can make ready earlier to reduce any disadvantage to minimum.

The Phases of the Moon and Its Changes

The moon is the celestial body that is the nearest to the earth. As a natural satellite of the earth, it has a very close relationship with the earth. The most profound impression that the moon gives its change between new and full.

The moon changes its shape between new and full phases which are called the phases of the moon. The moon is lightless, and opaque as well, but it can reflect sunlight. As the position of the sun, earth, and moon changes, the illuminated part of the moon that the observer on the earth can see changes, So the shape seems to change. The moon's phases have their own order.

The period of the phase change of the moon gives people a way to measure time. Ancient people measured time by the moon's phases. The

lunar month is based on the period of the moon's phase changes. In addition, from a new moon to the first quarter, from the first quarter to a full moon, from a full moon to the third quarter, and from the third quarter to a new moon again, these new, full, and two quarters add up to four phases. Every phase is about 7 days, and it is used as a natural time measure. The week came from it.

Post-reading

1. What are the sunspots?
2. How do the sunspots affect the earth?
3. What are the flares?
4. How do the flares affect the earth?
5. Describe the formation of the phases of the moon.

Integrating skills

1. Discuss the impacts of the sun on the earth.
2. Observe the phases of the moon for a month continuously, and record and sum up the rule of the moon's phase changes.

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