はじめに

Our Home the Earth は科学技術に焦点を当てた、「中級の上」レベルの読解用テキストブックです。多分野に及ぶ最新のテーマを盛り込んだ全22ユニットは、学生が親しみやすい話題で、しかも興味をそそる内容です。

地球温暖化、遺伝子組み換え、SARS流行、インターネット——などがその話題の一部です。このテキストブックでは、科学のいくつかの基本概念を取り上げて説明しています。例えば、宇宙の始まり、人類の進化、DNAなど。学生の皆さんはこのテキストブックを使用することで、英語読解能力を高めるということだけでなく、科学を題材にした英語の文章に触れる機会を得ることになります。科学用語の語彙を増加させ、さらに図表やグラフなどの読み取り能力を高めることもできます。

Our Home the Earth で取り上げる題材は、私たちが直面する問題で内容は多少複雑で難しいものですが、理解しやすい“読者に優しい”言葉で書かれています。だれにとっても、とても“近づきやすい”のです。理系の学生だけではなく、英語を学ぶすべての学生が有用性を見いだせるテキストブックとなっています。

本書の使い方

Background information and essential words and phrases

ここに登場する語（句）は、本文への導入となるもので、キーとなる語（句）と基本的概念が取り上げられています。このユニットのテーマに関するそれぞれの文章を完成することで、皆さんはすでに学んでいる知識をよみがえらせ、それをまとめることができます。

Reading passage

最初の語句問題を終了したら、本文へ進んでください。本文を読み終わった後の語句問題のために、10の語（句）が太字になっています。必要に応じて、本文中に挿入された図表を参照してください。本文の終りに英語の語句の日本語訳・解説があります。

Vocabulary study

文中から抜き出された10の重要語句について、それぞれの意味をａ～ｊの中から選んでください。辞書はなるべく使わずに、文脈からその語句の意味を考えてみてください。

Comprehension questions

この多肢選択式問題は、本文の主要点とさらにその細部についてまでを理解したかどうかを確認するものです。全ユニットを通して3つのスタイルの問題がランダムに登場します。①「穴埋め」型：文中の空欄（下線部）に入る適切な語句を選んでください。②「文完成」型：文の出だしに続いて、文を完成させるための適切な選択肢を選んでください。③「問答」型：質問に対する適切な答えを選んでください。設問の中には、本文中に挿入された図表を参照して答えるものもあります。これにより、図表などの視覚情報の読み取りに役立つ練習ができます。

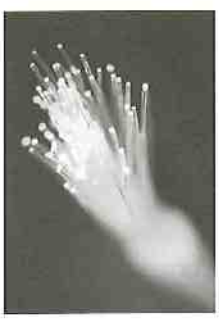
Summary and listening practice

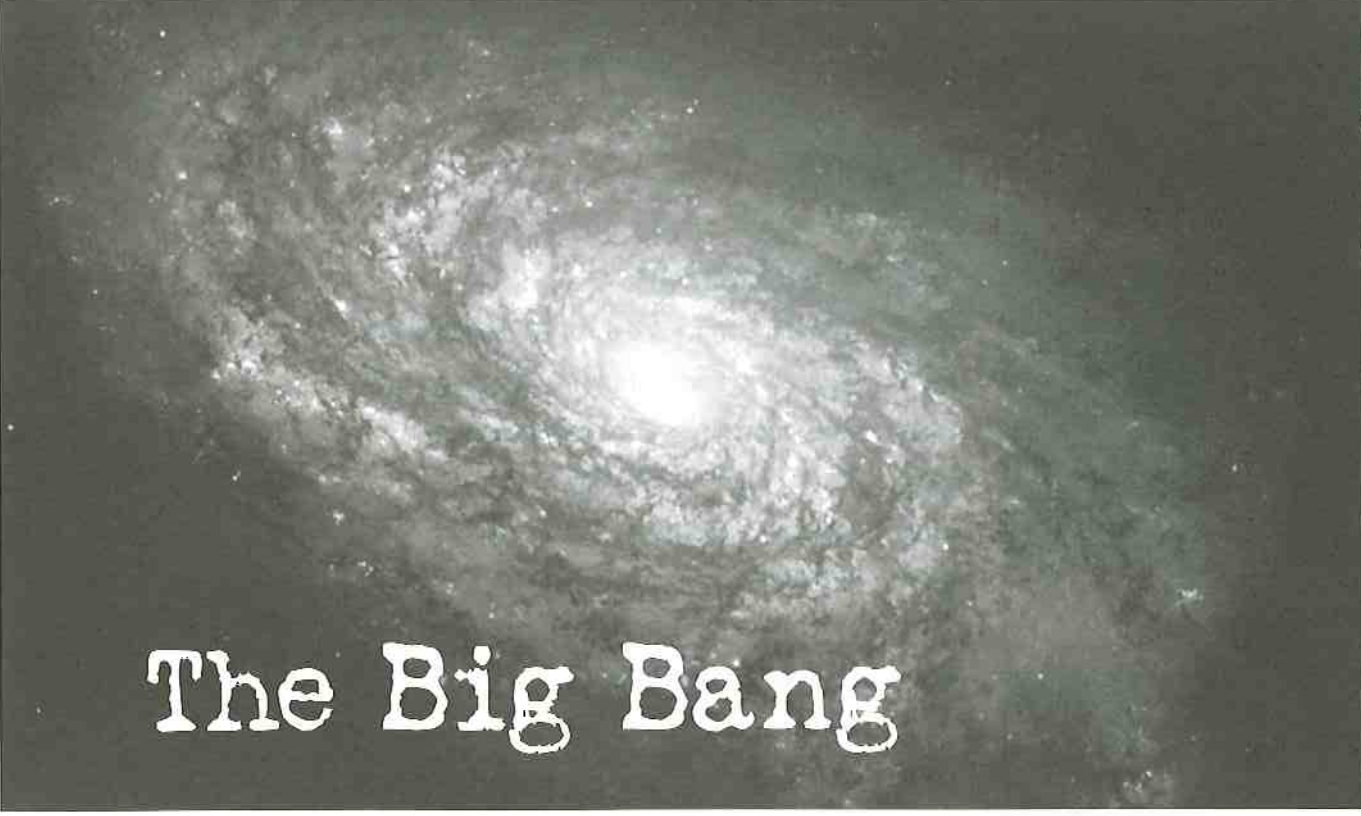
本文を1段落に要約したものですが、数語が抜け落ちています。まず最初に、皆さんの本文理解を頼りに、できるだけ空欄（下線部）を埋めてください。次にCD録音を聞いて、残りのすべての空欄に単語を記入してください。ここでは、良い要約の書き方を例示するとともに、CDを使用することで、このユニットでの重要語句・文を耳で確認する機会を提供しています。

Structure and written expression

ここの問題は、TOEIC®で出題される文法・語彙問題のパターンを参考にしています。本文に関連する6つの文を完成するために、それぞれ適切な語（句）を選んでください。①適した意味の語（句）を選ぶ場合と②文法的に正しい語（句）を選ぶ場合の2通りがあります。

Contents





The Big Bang

UNIT 1

ビッグバン（宇宙の大爆発）が宇宙のスタートと考えられています。宇宙空間に誕生した恒星と銀河（星の集団）は、いまどうなっているのでしょうか。膨張し続けるといわれている宇宙が、今後収縮に転じることがあるのでしょうか。

BACKGROUND INFORMATION AND ESSENTIAL WORDS AND PHRASES

Complete the sentences using words or phrases from the box below. You may change the form of the words or phrases.

physicist
theory
(an idea which explains something)
element
(a basic substance)
galaxy
explosion
(a sudden release of energy)
gravity
(the force of attraction that brings objects together)

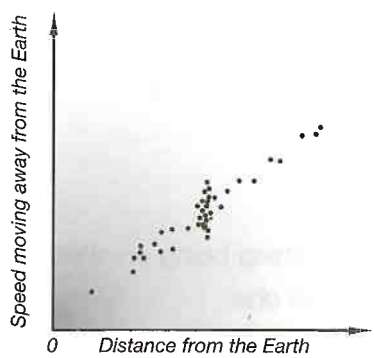
1. Several _____ have been proposed to explain how the universe began.
2. Scientists now believe that the universe began with a big _____.
3. Hydrogen and helium are the two most common _____ in the universe.
4. Every _____ contains billions of stars.
5. If you drop something, it falls to the ground because of _____.
6. _____ are the scientists who study energy, matter and forces in the universe.

The evolution of the universe 1-02

About 80 years ago, American astronomer Edwin Hubble discovered that the universe is **expanding**[1]. Other stars and galaxies are moving away from us, and the further away they are, the faster they are moving. This is called Hubble's Law.

The fact that the universe is expanding means that it must have started from somewhere. Astronomers now believe that it was created in the "Big **Bang**"[2] about 15,000 million years ago and has been expanding ever since. The Big Bang was an enormous explosion that created all the **matter**[3] and energy in the universe. About 75 percent of this matter was hydrogen and about 25 percent was helium, the two lightest elements. Before the Big Bang, there was nothing. The Big Bang theory was first proposed by Russian-American physicist George Gamow. A theory like this is impossible to prove. But it was accepted by most astronomers after American physicists Arno Penzias and Robert Wilson discovered what is called "background radiation". This is radiation left over from the Big Bang. Penzias and Wilson received the 1978 Nobel Prize in Physics for their discovery. The Nobel Prize is never awarded to people who have died, so Gamow, who died in 1968, did not share the award.

About 300 million years after the Big Bang, stars and galaxies started to form. Stars, such as our sun, are enormous balls of hydrogen and helium brought together by the force of gravity. Gravity forces them to **contract**[4] and causes very high pressures and temperatures. The pressure at the center of our sun is over one billion atmospheres and the temperature is over 10 million degrees Celsius. The high temperatures cause hydrogen atoms to **combine**[5] and form helium atoms in what is called a fusion **reaction.**[6] This reaction releases heat and light energy, which is **radiated**[7] out into space. Galaxies are groups of stars. Most galaxies contain hundreds of millions of stars. Our galaxy is called the Milky Way.



Hubble's Law states that the further galaxies are from us, the faster they are moving away. Each point on the graph represents a galaxy.

Stars do not last forever, since they are constantly using up their hydrogen and helium. They "die" in a number of different ways that depend on how big they are. Some form **black holes**[8] when they die. Others die in an enormous explosion called a supernova. In this explosion, which happens very quickly, all the other elements that exist in the universe are

Galaxy NGC 4414, a spiral galaxy about 60 million light years distant from us.

created and blown out into space. The force of gravity then causes some of these elements to come together to form planets. So all the elements that make up the universe, except for the hydrogen and helium created in the Big Bang, were created by exploding stars. All the carbon, oxygen, nitrogen and other elements that make up our bodies were created in this way. This is why some people call us "children of the stars".

Our sun was created 5 billion years ago and will live for another 5 billion years. New stars are still being created in the universe. Astronomers are unsure about the future of the universe. Will it keep expanding forever? Or will the force of gravity stop the expansion and cause the universe to **collapse**?[9] It depends on how much matter exists in the universe. If there is enough to stop the expansion, it will cause the universe to collapse into itself in what is called the "Big **Crunch**".[10]

star「恒星」太陽のように自ら光や熱を放つ重力的に結合した高温ガス球（惑星は **planet**） **atmosphere**「気圧」 **Celsius**「セ氏」= **centigrade**（カ氏は **Fahrenheit**） **gravity**「重力，引力」 **galaxy**「銀河」銀河系（**the Milky Way galaxy**）と同じ形態の恒星の大集団 **universe**「宇宙」 **space**「（地球の大気圏外の）宇宙空間」 **fusion reaction**「核融合反応」 **supernova**「超新星」大質量星の進化の最終段階における大規模な爆発現象

VOCABULARY STUDY

Match each word or phrase with its definition. Try to guess the meaning from the context without using a dictionary.

1. expand	a. to send out heat and/or energy
2. bang	b. to become smaller
3. matter	c. a point in space with very high gravity
4. contract	d. the sound made by an explosion
5. combine	e. solids, liquids and gases
6. reaction	f. to become larger
7. radiate	g. the sound made by something being crushed
8. black hole	h. to join together to become one
9. collapse	i. a change that happens when substances come together
10. crunch	j. to fall into itself

COMPREHENSION QUESTIONS

Circle the best answer, a, b, c or d, to each of these questions.

1. Edwin Hubble found:
   a. that our sun was created 15,000 years ago.
   b. that the universe is becoming smaller.
   c. that galaxies further away from the Earth are moving away faster.
   d. a new galaxy.

2. The Big Bang:
   a. created all the matter and energy in the universe.
   b. occurred 15 million years ago.
   c. was suggested by Edwin Hubble.
   d. was proved in 1978.

3. A fusion reaction creates energy by:
   a. creating very high pressures.
   b. creating very high temperatures.
   c. forcing hydrogen atoms to combine.
   d. creating a black hole.

4. When stars die, they may:
   a. explode and form black holes.
   b. explode as supernova.
   c. create "star children".
   d. none of the above (not a, b *or* c)

5. Astronomers say:
   a. that they don't really know what will happen to the universe in the future.
   b. that one day the universe will collapse.
   c. that the universe will continue to expand.
   d. that the universe will end in 5 billion years.

6. The graph shows the correlation between:
   a. galaxies' sizes and their distance from us.
   b. galaxies' sizes and the speed at which they are moving away from us.
   c. the speed at which galaxies are moving away from us and their distance from us.
   d. the speed of the Earth and the speed of various galaxies.

SUMMARY AND LISTENING PRACTICE

CD 1–03

Read the paragraph and fill in as many blanks as you can. Then listen to the recording and fill in the rest of the blanks.

The _____ _____ theory is an attempt to explain how the universe began. The theory is accepted because we know that galaxies are moving away from us very quickly, and also because _____ have found background radiation from 15,000 million years ago. After the Big Bang, _____ forced hydrogen atoms together in _____ reactions. These reactions created stars and galaxies. When some stars die, they collapse and become _____ holes. Other stars explode as supernova. There are several _____ to predict what will happen in the future. Some scientists believe that the universe will continue to expand; others believe the universe will collapse in the Big _____.

STRUCTURE AND WRITTEN EXPRESSION

Complete the sentences using the most appropriate words or phrases. You may refer to the main text to choose the best option.

1. Astronomers _____ that the universe began with the Big Bang.
   a. mean b. discovered c. start d. think

2. It is _____ to prove the theory of the Big Bang.
   a. easy b. difficult c. impossible d. acceptable

3. In a fusion reaction, hydrogen atoms _____ to form helium.
   a. combination b. combines c. combining d. combine

4. During a supernova, elements are _____ into space.
   a. blow out b. blows out c. blew out d. blown out

5. _____ all the elements in the universe were created by supernova.
   a. Almost b. Apart c. Mainly d. Every

6. The force of gravity _____ the universe to stop expanding.
   a. causes b. caused c. might cause d. might caused