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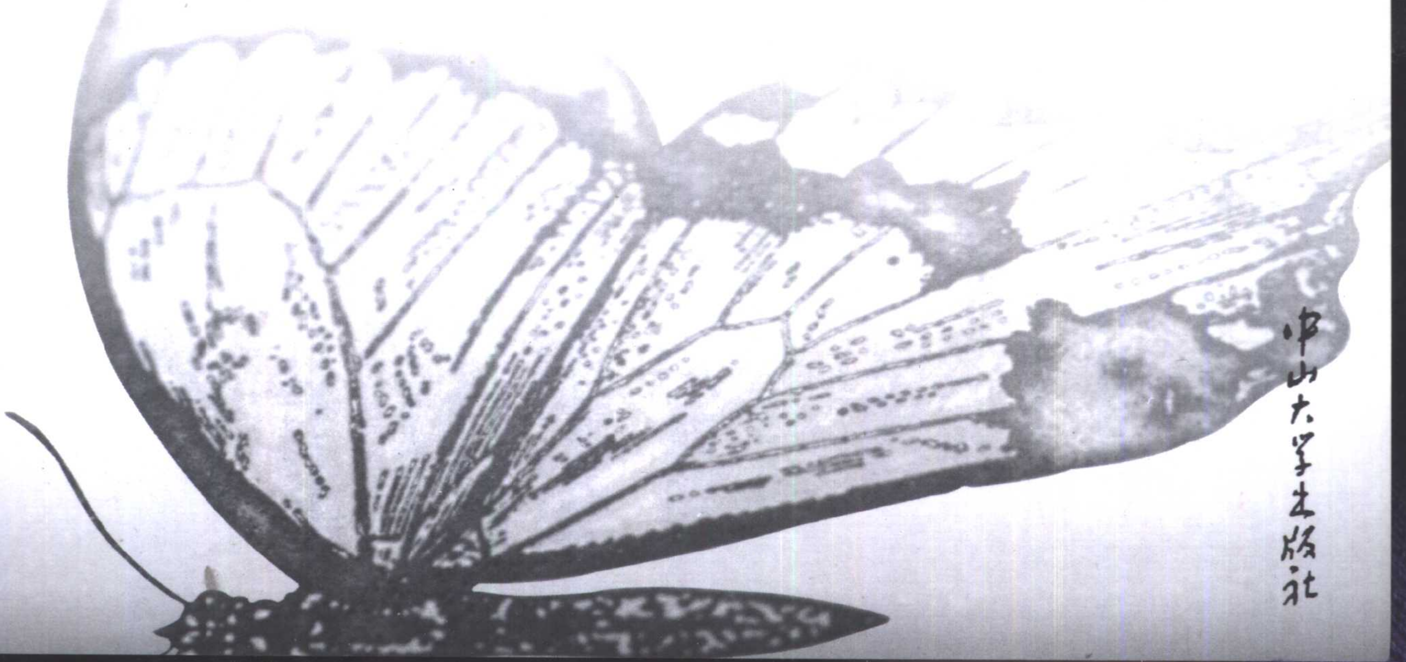
SPECIALIZED ENGLISH IN BIOLOGY

生物学专业英语

张润杰
周昌清 编著
周 强



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·广州·

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内容提要

本教材由16个单元共56篇课文组成，每单元包括主讲课文和阅读文选两部分，并配以适当练习。主要内容有：第一单元“生物学面临的机遇与挑战”，第二单元“生命起源与进化”，第三单元“动物生物学”，第四单元“植物生物学”，第五单元“细胞生物学”，第六单元“生态学”，第七单元“生物学实验”，第八单元“害虫防治”，第九单元“环境保护”，第十单元“微生物学”，第十一单元“生物化学与分子生物学”，第十二单元“遗传学”，第十三单元“基因工程”，第十四单元“生物科学与技术的新闻报道”，第十五单元“生物科学论文选读”，第十六单元“WTO与检疫”。上述内容基本覆盖了生物学一级学科的主要分支学科。学生通过学习本教材，不但可以学习到生物学专业英语，而且能增加不少生物学方面的知识。

本书既可作为高等院校生物学专业英语教材，也可作为从事生物学、农林等方面工作的专业人员的专业英语学习材料。

前　言

21世纪是生命科学的世纪，以英语为载体的生物信息将成倍增长，对外学术交流将更加频繁。新世纪生命科学的毕业生不仅要掌握先进的生命科学知识和技术，而且要具备扎实的外语能力。毫无疑问，新世纪生命科学与技术的发展将对生物学专业英语教学提出更高的要求。

1998年以来，我们接受中山大学生命科学学院交给的任务，组织编写“生物学专业英语”教材。1999年初，本教材的第一版本印刷出来供96级和97级的同学试用，大家对教材反应不错，但认为存在不少问题。2000年暑假，我们集中精力对本教材的第一版本进行了一次全面修订，补充增加了一些新内容，供98级和99级同学试用，效果较好，但还是发现不足的地方。今年上半年，我们又在上述基础上作了一次认真修订，增加了“WTO与检疫”这一单元，并补充了一些练习内容，形成了现在的版本。

在整个编写过程中，我们力求使本教材体现先进性、科学性和应用性。我们从国外最新出版的教科书、专著、外文刊物和有关英文报纸中选取材料，把国内外最新的科研成果如‘人类基因组计划”、“生态学与环境保护”以及“杂交水稻”等及时编进教材，选材尽量新颖先进，紧密跟踪生命科学的发展。根据教学大纲的要求，本教材从培养学生阅读能力、科技论文写作能力以及学术交流能力着眼，编写了16个单元共56篇课文，内容基本覆盖了生物学一级学科的主要分支学科，专业词汇量在1000～1200个之间。同时把“实验方法”、“科技论文导读”和“WTO与检疫”编进教材，增强本教材的实用性。每篇课文配置了词汇表、习惯用语表达、课文难点解释，以及适量的练习。为便于学生对课文的阅读理解，课文还配置相应的插图，尽量使课文图文并茂。书后附有单词索引、习惯用语索引以及练习参考答案，方便查阅和自测。

本教材在编写和修订过程中，始终得到中山大学生物防治国家重点实验室和生命科学学院的领导、教师和学生的热情关心和大力支持，我们在此表示衷心的感谢。

由于水平有限，加上时间仓促，教材中定有不少错漏，恳请读者批评指正。

编著者

2002年8月28日

CONTENTS

Unit One

Challenges and Opportunities in Biology Today

Lesson 1

Challenges and Opportunities in Biology Today

Anyone who reads a daily newspaper is well acquainted with world problems: overpopulation, famine, crime, drug addiction, AIDS, cancer, heart disease, pollution, ozone depletion, acid rain, changes in climate. While these problems tend to have multiple roots, their biological bases may yield to biological solutions, and these solutions, in turn, will help ease the associated pressures on society. For this reason, citizens in all fields must understand the biological bases of the world's problems.

Many of our most vexing problems stem from our species' enormous and burgeoning population. Five billion people are currently straining our planet's environmental resources, and by the year 2000, we will number 6 billion. This immense population is accumulating because the human species, like all others, is finely honed to overcome the tendencies toward disorganization and death. The resulting human adaptations—the abilities to reason, communicate, and manipulate the physical world—have been so successful that our single species is busily exhausting the limited resources that support all life on our small planet. Many observers believe that our future security and quality of life are threatened less by war among nations than by the burden we place on natural systems and resources with the sheer crush of humanity.

Take, for example, the plight of Madagascar, an island 1600 km (1000 miles) long off the southeast coast of Africa. In this past 35 years, half of Madagascar's forests have been leveled to provide fuel and to uncover farmland for the impoverished and rapidly growing population. Heavy rains, however, cause the cleared hills to erode, bleeding the rich red topsoil into the rivers and destroying the land's ability to grow crops. Farmers plant clove tree seedlings on the cleared slopes and then wait seven years before the first full crop of the spicy pungent flower is ready for harvest and export, simply hoping that the slope will not wash away before harvest. Whole villages depend on the developed world's appetite for vanilla ice cream, cola drinks, and other foods that contain extracts from clove buds. Yet their own children go hungry because cloves are not an adequate food source.

The exploitation of Madagascar's forests and wildlife began long ago when the human population was much smaller, and in the process, many species became extinct, including the "elephant bird," an astonishing animal that stood 3 m (10 feet) tall, weighed 500 kg (half a ton), and laid 10-kg (20-pound) eggs. The destruction has since accelerated, and with it has come the loss of hundreds of species, including plants that produce potentially life-saving drugs. Residents of Madagascar export a pinkpetaled periwinkle flower to pharmaceutical companies in Europe and North America that use the petals to make drugs for children with leukemia. Many observers fear that many such plants with potential uses in medicine and agriculture will perish along with Madagascar's tropical forests before they are ever studied and applied. And worse, they fear that Madagascar's own people are not even benefiting substantially from the wholesale clearing of forested lands.

Two decades ago, one might have predicted a similar fate for the central American nation of Costa Rica. Although this small country's national debt is one of the highest in the world per citizen, the leaders are committed to sustainable development based on the application of modern biological principles and practices. Among other things, Costa Ricans are replanting deforested hillsides with fast-growing tropical hardwood trees. They are also growing nutritionally improved food crops, attempting to set aside up to 15 percent of their land as natural preserves for their tropical species, and instituting up-to-date health care and family-planning practices whenever possible. Costa Rica's success is a hopeful sign for the future: biological solutions for social problems of biological origin.

You will find many discussions of how biology is helping to solve social problems. We are, in fact, in the midst of a revolution in the biological sciences, with exciting new information surfacing weekly in the fight against cancer, heart disease, AIDS, infertility, and obesity. Researchers are making rapid advances in gene manipulation to create new drugs, crops, and farm animals; in sports physiology to improve human performance; in the diagnosis of genetic diseases; and in the transplantation of organs, including brain tissue. Across all frontiers of biological science, at all levels of life's organization—from molecules to the biosphere—scientists are learning the most profound secrets of how living things use energy to overcome disorganization and reproduce to overcome death. In studying the living world, you are embarking on an adventure of discovery that will not only excite your imagination and enrich your appreciation of the natural world, but will provide a basis on which you can contribute intelligently to the difficult choices society must make in the future.

New Words

famine [ˈfæmin] *n*. 饥荒

depletion [diˈpliːʃən] *n*. 放空,耗尽

vex [veks] *vt*. 害苦,使…烦恼

strain [strein] *vt*. 使…紧张,滥用

sheer [ʃiə] *a*. (修饰表示环境的名词)全然的,纯粹的,绝对的

plight [plait] *n*. 困境,苦境

impoverish [imˈpɔvəriʃ] *vt*. 使(人)贫苦,弄穷

erode [iˈrəud] *vt*. 侵蚀,腐蚀

spicy [ˈspaisi] *a*. 芳香的,辛辣的

pungent [ˈpʌndʒənt] *a*. (指气味、味道)刺激性(的),刺鼻的,辛辣

vanilla [vəˈnilə] *n*. 香子兰果,香草精

astonish [əˈstɔniʃ] *vt*. 令人惊讶

periwinkle [ˈperiwiŋkl] *n*. 长春花

petal [ˈpetl] *n*. 花瓣

leukemia [ljuːˈkiːmiə] *n*. 白血病

perish [ˈperiʃ] *vt*. 毁灭,死亡

obesity [əuˈbiːsiti] *n*. 肥胖,肥胖症,脂肪过多

embark [imˈbaːk] *vt*. 从事,着手

Idioms and Expressions

tend to 有…的趋势,趋向于…,有助于…

along with 与…一道,随着,与…同时

be committed to 把…托付给,把…交给,把…提交

attempt to 试图…,努力…,设法…,着手…
in turn 依次,本身又
be acquainted with 熟悉,认识
embark on 从事,着手,开始工作

Notes to the Text

1. While these problems tend to have multiple roots, their biological bases may yield to biological solutions, and these solutions, in turn, will help ease the associated pressures on society.
这些问题的根源是多方面的,它们的生物学基础可以用生物学方法来解决,而这些问题的解决反过来将有助于减轻对社会的压力。
2. In studying the living world, you are embarking on adventure of discovery that will not only excite your imagination and enrich your appreciation of the natural world, but will provide a basis on which you can contribute intelligently to the difficult choices society must make in the future.
在研究生物世界过程中,你正从事着冒险的探索,它不仅激发你的创造力,丰富你对自然世界的鉴别能力,而且为你将来对人类错综复杂社会作出理智的贡献打下基础。

Questions

1. What are the problems occuring in human society?
2. What are the biological bases of the world's problems?
3. What was the situation in Madagascar in the past 35 years?
4. What was the situation in Costa Rica two decades ago?
5. How is biology helping to solve social problems?

Exercises

1. Matching

1) strain	a) abbrev. for acquired immuno-deficiency syndrome
2) famine	b) state of being adapted
3) AIDS	c) extreme scarcity of food in a region
4) leukemia	d) stone used for sharpening tools
5) infertility	e) disease in which there is an excess of leucocytes
6) obesity	f) of medicinal drugs
7) adaptation	g) make the greatest possible use of
8) hone	h) be able to keep up or maintain
9) sustainable	i) being very fat
10) pharmaceutical	j) state of being not able to produce young

2. True or False

1) Among all the factors concern to the world's problems, such as overpopulation, pollution, etc., biology is an important one.
2) Our earth can provide enough resources to 6 billion people in the world.

3) Comparing with war, the population burden is a much more serious threaten to us.
4) The population in Madagascar grew so rapidly that the forest had to give way to farmland.
5) Clove is not only a good perfume, but also an adequate food for man.
6) You can still find elephant bird, a kind of huge animal in Madagascar.
7) The petals of periwinkle flowers are a key material in making drugs for leukemia.
8) Costa Rica, a small country with heavy debt, is now facing the same fate with Madagascar.
9) Tropical hardwood trees grow fast, which make them good choices when deforested hillsides need to be replanted.
10) Researches on biological science can be applied to social science.

3. Reading Comprehension

1) Many observers believe that our security and quality of life are threatened less by war among nations than ________.
   A. by the burden we place on natural
   B. by the resources with the sheer crush of humanity
   C. by the war among nations
   D. both A and B
2) Which one is not sure in Madagascar?
   A. Half of forests have been leveled.
   B. Farmers plant too many crops.
   C. Their children maybe go hungry.
   D. Many species became extinct.
3) Which one is not sure in Costa Rica?
   A. Costa Rica is one of richest countries.
   B. The leaders committed to apply modern biological principles and practices.
   C. Costa Rica has grown a lot of tropical hardwood trees.
   D. They set up natural preserves.
4) It can not be inferred from this paper that ________.
   A. there are many problems in this world
   B. biology is developing slowly
   C. we should understand the biological base of the world's problems
   D. we solved a lot of problems using biology
5) What is the main idea of this passage?
   A. There are many problems in the world.
   B. We have found the approach to solve problems.
   C. Biology is the only opportunity today.
   D. We can use biological solutions for social problems.

Lesson 2

Biology Is the Study of Life

(Reading Material)

Biology is a science that attempts to understand the teeming diversity of life on earth, of which we are a part. It is important that mankind learn how to live in harmony with earth's other residents. The science of biology has much to contribute to this effort. A good way to start your study of biology is to focus for a moment on biology's subject: life. What is life? What do we mean when we use the term? This is not as simple a question as it appears, largely because life itself is not a simple concept. Pause for a moment and try to write a simple definition of "life." You will find that it is not an easy task. The problem is not your ignorance, but rather the loose manner in which the concept "life" is used. For example, imagine a situation in which two astronauts encounter a large, formless blob on the surface of some other planet. One might say to the other, "Is it alive?" We can try to answer the question of what life is by observing what the astronauts do to find out whether the blob has life. Probably they would first observe the blob to see whether it moves.

Movement. Most animals move about. A horse winning the Kentucky Derby, a dog chasing a car, you rolling over in bed—movement seems an integral part of living. Movement from one place to another is not in itself a sure sign of life, however. Many animals, and most plants, do not move about, and many nonliving objects such as clouds can be observed to move. The criterion of movement is thus neither necessary—possessed by all life forms—nor sufficient—possessed only by life forms, even though it is a common attribute of many kinds of organism.

The astronauts might prod the blob to see whether it responds, and thus test for another criterion, sensitivity.

Sensitivity. Almost all living things respond to stimuli. Plants grow toward light, and animals retreat from fire. Not all stimuli produce responses, however. Imagine kicking a redwood tree or singing to a mushroom. Different kinds of organisms often react to the same stimuli in different ways. This criterion, although superior to the first one, is still inadequate to define life.

The astronauts might watch the blob to see whether it change, and thus test yet another criterion, development.

Development. Most multicellular organisms exhibit development, an orderly progressive change in form and degree of specialization. You, for example, started life as a single cell. As you grew to be an embryo and then a baby, different cell types developed, giving rise to brain and lung and bone, and finally to your adult form. Without development, you would be simply a large blob of similar cell. Not all living things exhibit development, however. A single-celled bacterium, for example, does not develop from a simpler form; its parent cell simply divides into two identical daughter cells. Nor are all things alive that undergo progressive, orderly change. The progressive, orderly series of rocks that can be seen on the walls of the Grand Canyon does not indicate that the canyon was ever alive.

The astronauts might think that the motionless blob had once been alive, but is now dead.

Death. All living things die, whereas no inanimate objects do. Death is not the same as disorder, however. A car that breaks down does not die; we may say, "The car died on me," or "I killed the engine," but the now-broken car was never alive. Death is simply the termination of life. Unless one can detect life, death is a meaningless concept. Death is a terribly inadequate criterion.

Finally, the astronauts might attempt to pick up the blob and examine it more carefully, to see how complex it is.

Complexity. All living things are complex. Even the simplest bacterium contains a bewildering array of molecules, organized into many complex structures. Complexity is not diagnostic of life, however. A computer is also complex, but it is not alive. Complexity is a necessary condition of life, but not sufficient in itself to identify living things, since many complex things are not alive.

To determine whether the blob is alive, the astronauts must learn much more about it. The best thing they could do would be to examine it more carefully and determine the ways in which it resembles living organisms. All organisms that we know about share certain general properties, ones that we think must ultimately have been derived from the first organisms that evolved on earth. It is by these properties that we recognize other living things, and to a large degree these properties define what we mean by the process of life. Four fundamental properties shared by all organisms on earth are:

Cellular organization. All organisms are composed of one or more cells, complex organized assemblages of molecules—the smallest units of a chemical compound that still have the properties of that compound—within membranes. The simplest organisms possess only a single cell; your body contains about 100 trillion.

Growth and metabolism. All living things assimilate energy and use it to grow in a process called metabolism. Plants, algae, and some bacteria utilize the energy of sunlight to create the more complicated molecules that make up living organisms from carbon dioxide (CO_2) and water (H_2O). The process by which they do this is known as photosynthesis. Nearly all other organisms obtain their energy by consuming these photosynthetic organisms, or one another, in a constant ebb and flow of energy. All of the organisms you see about you drive the processes of life within themselves by using chemical energy first captured by photosynthesis. In all living things, this energy is transferred from one place to another by means of special, small, energy-carrying molecules called ATP molecules.

Reproduction. Some organisms live for a very long time. Some of the bristlecone pines (*Pinus longaeva*) growing near timberline in the western Great Basin of the United States have been alive for nearly 5000 years. But no organisms live forever, as far as we know. Because all individual organisms ultimately die, life as an ongoing process is impossible without reproduction .

Homeostasis. All living things maintain an internal environment quite different from their surroundings, with more of certain chemicals and less of others. Maintaining relatively stable internal conditions in an organism is called homeostasis. If someone were to grind you up into a soup, you would not be alive, even though all the same molecules would be present. The relationship between the molecules, which forms the stable internal environment necessary for you to live, would have been destroyed.

Are these properties adequate to define life? Is a membrane-enclosed entity that grows and reproduces alive? Not necessarily. Soap bubbles in water solution spontaneously form hollow spheres, membranes that enclose a small volume of air. These spheres may grow and subdivide, and maintain an internal environment quite different from the water surrounding them. Despite these features, the soap bubbles are certainly not alive. Therefore the four criteria just listed are necessary for life but are not sufficient to define life. One ingredient is missing: heredity, a mechanism for preserving features that determines what an organism is like.

Heredity. All organisms on earth possess a "genetic" system that is based on the replication (duplication) of a complex linear molecule called DNA. The order of the subunits making up the DNA contains, in code, the information that determines what an individual organism will be like, just as the order of letters on this page determines the sense of what you are reading. Blocks of coded information in the DNA contain the direction for creating the molecules that determine what organisms are like. These subunits of DNA are called genes.

To understand the role of heredity in our definition of life, let us return for a moment to bubbles. When examining an individual bubble, we see it at that precise moment in time, but we learn nothing of predecessors. It is likewise impossible to guess what future bubbles will be like. The bubbles are the passive prisoners of a changing environment, and it is in this sense that they are not alive. The essence of being alive is the ability to reproduce permanently the results of change. Heredity, the transmission of characteristics from parent to offspring, therefore provides the basis for the great division between the living and the nonliving. A genetic system that enables this transmission to occur is the sufficient condition of life.

A natural consequence of heredity is adaptation. An adaptation is any peculiarity of structure, physiology (life processes), or behavior that promotes the likelihood of an organism's survival and reproduction in a particular environment. Organisms seem remarkably well suited to the environments in which they live. In the course of the progressive adaptation of organisms to the condition of life on earth—a process known as evolution—those organisms that were less suited to particular places have not persisted. The ones that are found there today are the "winners," for the moment. When we look at any living organism, therefore, we see in its features a record of its history. Not only does life evolve, evolution is the very essence of life.

New Words

teem [tiːm] *vi*. 富饶;多

loose [luːs] *a*. 不严谨的;不精确的,不严格的

blob [blɔb] *n*. 无一定形状的东西

chase [tʃeis] *vi*. 追逐;追赶;追踪

prod [prɔd] *vt*. ①(用手指、棍棒等)刺,戳,捅;②刺激,推动,惹起

retreat [riˈtriːt] *vi*. ①退却,撤退,后退;②退避,躲避;③退缩,规避

multicellular [mʌltiˈseljulə] *a*. 多细胞的

specialization [speʃəlaiˈzeiʃən] *n*. ①特殊化、专门化;②特化(作用),专化性

embryo [ˈembriəu] *n*. 胚胎,胚

bacterium [bækˈtiəriəm] *n*. 细菌(复数 bacteria)

inanimate [inˈænimit] *a*. 无生命的,无生气的

bewilder [biˈwildə] *vt*. 迷惑,把…弄糊涂

molecule [ˈmɔlikjuːl] *n*. 分子,克分子

assemblage [əˈsemblidʒ] *n*. 集合,集合物

trillion [ˈtriljən] *num*. ①百万的三次(英、德);②万亿(美、法) *n*. 大量,无数

metabolism [məˈtæbəlizəm] *n*. 新陈代谢,代谢作用

assimilate [əˈsimileit] *n*. ①吸收;②同化 *vi*. 被吸收,被同化

algae [ˈældʒi] *n*. 水藻,海藻(单数 alga)

photosynthesis [ˌfəutəuˈsinθəsis] *n*. 光合作用,光能合成

ebb [eb] *n*. *vi*. ①落潮,退潮;②衰落,衰退

homeostasis [ˌhəumiəuˈsteisis] *n*. 体内平衡

bubble [ˈbʌbl] *n*. 泡,水泡,气泡

heredity [hiˈrediti] *n*. 遗传,遗传特征

adaptation [ˌædæpˈteiʃən] *n*. 适应,适应性的变化

evolution [iːvəˈljuːʃən, evəˈljuːʃən] *n*. ①进展,发展,演变;②进化,演化

spontaneously [spɔnˈteinjəsli] *adv*. 自发地、自然地

Idioms and Expressions

in (out of) harmony with 与…(不)协调一致;与…(不)和睦融合

keep sb. in ignorance of sth. 不让某人知道某事

give rise to 引起;使发生;产生

break down 坏掉;抛锚

pick up 拾起;捡起;获得;逮住

derive from 起源;衍生;导出

as far as we know 就我们所知

even though 即使;虽然

same as 像…一样;与…相同

by means of 借助;通过;用

make up 组成;构成;形成

known as (就是)通常所说的;以…著称;通称

ebb and flow 涨落,盛衰,消长

ongoing 不断发展中的,不断前进中的

carbon dioxide 二氧化碳

Notes to the Text

1. Grand Canyon 科罗拉多大峡谷(美国)。
2. Derby [ˈdaːbi] 德比马赛(英国传统马赛之一)。
3. Kentucky Derby 肯塔基马赛。
4. The criterion of movement is thus neither necessary—possessed by all life forms—nor sufficient—possessed only by life forms, even though it is a common attribute of many kinds of or-