

Science and Technology

Learning Objectives

1. What a thesis is in an essay;
2. How an expository essay is composed.

Reading



Text A

Climate Change and the Mystery of the Shrinking Sheep¹

- 1** The mysterious shrinking sheep of Hirta sounds like a job for super **sleuth** Sherlock Holmes. The case involves a rare herd of wild sheep on the remote Scottish island — known in Scottish Gaelic² as Hirta — that are refusing to **bow** to conventional **evolutionary** pressure, which says big is best. Instead, they have steadily decreased in size since the 1980s.
- 2** The island of Hirta, part of the isles of St Kilda on the western coast of Scotland, is home to a special **breed** of sheep, Soay sheep. They are the most primitive breed of domestic sheep and have lived on the isles of St Kilda for at least a **millennium**. They are generally smaller than the average **domesticated** sheep, and that difference is getting



¹ The text material is partly retrieved and adapted from the news report on the website of *Science Daily* at <http://www.sciencedaily.com/releases/2009/07/090702140845.htm>.

² Gaelic [ˈgeɪlɪk]: one of the Celtic languages, especially spoken in parts of Scotland and in Ireland. 盖尔语

larger and larger. Over the last 20 years, the Soay sheep have started to shrink. A new study provides evidence for climate change as the cause of the mysterious decrease in the size of the wild sheep on the Scottish island of Hirta, first reported by scientists in 2007.

3 Soay sheep live in a closed population that doesn't have to deal with human **interference**, **predators**, migrants (either in or out), or significant competitors. That makes them an ideal population to study if you are an evolutionary biologist interested in how animal populations change over time. One such group, including Ozgul and his colleague Tim Coulson from Imperial College London, have been studying the Soay sheep since 1985.

4 Classical evolutionary theory suggests that over time the average size of wild sheep increases, because larger animals tend to be more likely to **survive** and reproduce than smaller ones, and **offspring** tend to resemble their parents. However, among the Soay sheep of Hirta, average body size has decreased by **approximately** 5% over the last 24 years. They are becoming gradually lighter at all ages such that today's lambs and adults weigh around 3kg less than those from 1986. Their hind legs have also shortened to a similar degree, suggesting that they have indeed shrunk, rather than fallen increasingly ill. The research team analyzed body size and life history data, which records the **timing** of key **milestones** throughout an individual sheep's life, for Soays on Hirta over this 24-year period. They found that sheep on the island are not growing as quickly as they once did, and that smaller sheep are more likely to survive into adulthood. This is bringing down the average size of sheep in the population overall.

5 The team wanted to work out the extent to which the sheep's shrinking size is due to the influence of natural selection and to what extent it is just an ecological response to changing environments. To that end, they developed a mathematical model designed to analyze their 24 years of data and **tease** apart these contrasting effects.

6 The model showed that natural selection favours heavier individuals, who are more likely to make it past the first two years of life. But these effects were **paltry** and largely **counteracted** by a far more important influence — the difference in body weights between parents and their young. Every August, year on year, the **ewes** were **rearing** daughters that were around 150g lighter than they were at the same age.

7 Young ewes simply cannot produce larger young when they themselves are reproducing earlier and failing to reach full adult body size. The “young mum effect” explains why Soay sheep have not been getting bigger, as they are expected to according to evolutionary theory. But it is not enough to explain why they are shrinking.

8 Professor Coulson suggests that shorter, milder winters caused by global climate change, mean that lambs do not need to **put on** as much **weight** in the first months of

life to survive to their first birthday as they did when winters were colder. He explains, “In the past, only the big, healthy sheep and large lambs that had piled on weight in their first summer could survive the **harsh** winters on Hirta. But now, due to climate change, grass for food is available for more months of the year, and survival conditions are not so challenging, even the slower growing sheep have a chance of making it, and this means smaller individuals are becoming increasingly **prevalent** in the population.” Their results suggest that the decrease in average body size seen in Hirta’s sheep is primarily an ecological response to environmental changes over the last 24 years; evolutionary change has contributed relatively little.

9 The researchers believe that, due to climate change, survival conditions on Hirta are becoming less challenging, which means slower-growing, smaller sheep are more likely to survive the winters than they once were. This, together with so-called “young mum effect” **whereby** young ewes produce smaller offspring than expected, explains why the average size of sheep on the island is decreasing. These two factors are combining to **override** what we would expect through natural selection. Climate, then, is the chief culprit behind the mystery of Scotland’s shrinking sheep.

10 As for the future of the sheep, the team believes that they are still shrinking. “The next step is to extend our description of past change into a predictive model,” said Professor Coulson. “But it’s too early to say if, in 100 years, we will have pocket-sized sheep.” And it is difficult to say what the response of the Soay sheep could mean for other species, though biologists have reported that several species of birds and fish are changing size and shape, which could **be down to** global warming. Their island home, Hirta, is just “vegetation and sheep” he said. In other cases, predators and competition for food from other animals **complicate** the picture and make it difficult to tease out the influence of changing climate.



New Words and Phrases

approximately	[ə'prɒksɪmətli]	<i>adv.</i> 大概; 近乎
bow	[bau]	<i>vi.</i> 屈从, 顺从
breed	[bri:d]	<i>n.</i> 品种; 种类
★ complicate	['kɒmplɪkeɪt]	<i>vt.</i> 使(某事)复杂化
▲ counteract	[.kauntər'ækt]	<i>vt.</i> 对抗; 抵消
domesticate	[də'mestɪkeɪt]	<i>vt.</i> 驯养; 驯化
evolutionary	[i:və'lju:ʃənri]	<i>a.</i> 发展的; 渐进的; 进化的
◆ ewe	[ju:]	<i>n.</i> 母羊

harsh	[hɑ:ʃ]	<i>a.</i>	严峻的, 艰苦的
interference	[ˌɪntə'fɪərəns]	<i>n.</i>	干预, 干涉
★ milestone	['maɪlstəʊn]	<i>n.</i>	里程碑; 划时代的事件
◆ millennium	[mi'leniəm]	<i>n.</i>	一千年; 太平盛世
★ offspring	['ɒfsprɪŋ]	<i>n.</i>	子孙, 后代
▲ override	[əʊvə'raɪd]	<i>vt.</i>	比……更重要
◆ paltry	['pɔ:ltri]	<i>a.</i>	无价值的, 微不足道的
▲ predator	['predətə]	<i>n.</i>	捕食其他动物的动物; 食肉动物
★ prevalent	['prevələnt]	<i>a.</i>	普遍的, 流行的
rear	[riə]	<i>vt.</i>	养育; 饲养
◆ sleuth	[slu:θ]	<i>n.</i>	(口, 谚) 侦探
survive	[sə'vaɪv]	<i>vt.</i>	活过 / 挺过 (艰难时期); 幸免于
		<i>vi.</i>	幸存, 继续存在
★ tease	[ti:z]	<i>vt.</i>	梳理
timing	['taɪmɪŋ]	<i>n.</i>	时间安排; 时间选择
★ whereby	[weə'baɪ]	<i>adv.</i>	通过……, 借以

be down to

依赖, 依仗

put on weight

体重增加; 长胖

Exercises

Text Comprehension

I. Answer the following questions according to the text.

1. What is the uniqueness of the living conditions of the Soay sheep?
2. Why is the shrinking sheep said to be a mystery?
3. What do the data in Paragraph 4 indicate?
4. What is “young mum effect”?
5. What is climate effect on the change of the sheep size?
6. How do you explain the mystery of the shrinking sheep?

II. Complete the outline of the text.

Theme: The Soay sheep on the Scottish island Hirta are shrinking.

Method: A research group from Imperial College collected data over 24 years and analyzed them with a mathematical model.

Data: _____

Analysis: 1. _____

 2. _____

Conclusion: _____

Limits of the research: _____

III. Discuss the following topics with your classmates.

1. The Soay sheep are shrinking due to their living environment, especially the warming climate. If it is true for many other animals, what will it result in?
2. How has human body changed in the past centuries? What are the possible reasons?
3. Are there any other biological mysteries in nature? What are the culprits behind them?

Language Focus

I. Find an appropriate interpretation from Column B for each item in Column A.

A	B
1. sleuth	a. the baby or babies of an animal
2. bow	b. make wild animals used to living with humans; tame
3. breed	c. a person who investigate crimes; detective
4. domesticate	d. find something out from a mass of irrelevant information
5. offspring	e. be more important than
6. tease out	f. submit
7. paltry	g. because of which
8. prevalent	h. a particular type of animal
9. whereby	i. very small; unimportant
10. override	j. existing or happening generally

II. Complete the following sentences with appropriate words or expressions you have learned from the text. For each missing part there is a hint in the brackets.

1. A _____ of deer was making its way through the park. (a group of animals of

- the same type)
- The number of the rural poor dropped from 125 million to 80 million, with an annual _____ of 6.4 million on average. (becoming fewer, reduction)
 - All human beings are, in nature, psychologically _____. (simple and unsophisticated, as if from an earlier period of history)
 - The proportion in the 25 to 35 age has _____ to 7 percent. (become smaller in size or amount)
 - In New Zealand, there were no _____ before the arrival of man. (an animal that kills and eats other animals)
 - It seemed to Castle that he began to _____ more and more closely, in the vulgarity and brutality of his speech, the Captain Van Donck whom he despised. (be similar to)
 - Our house was built _____ one foot below the water surface. (almost correct or exact but not completely so)
 - Women have _____ become more involved in the decision-making process. (slowly, over a long period of time)
 - The small woman _____ a family of five on her own in the past 20 years. (care for the young until they are fully grown)
 - _____ were usually cast for five years on the farm. (female sheep)

III. Paraphrase the underlined part of each of the following sentences.

- The wild sheep on the remote Scottish island, Hirta, are refusing to bow to the conventional evolutionary pressure.
- The research group wanted to work out the extent to which the sheep's shrinking size is an ecological response to changing environments.
- The researchers found that the smaller sheep are more likely to survive into adulthood.
- But these effects were paltry and largely counteracted by a far more important influence.
- The lambs do not need to put on as much weight to survive to their first birthday as they used to.
- The survival conditions are not so challenging; even the slower growing sheep have a chance of making it.
- They are actually the culprit behind the mystery of Scotland's shrinking sheep.
- In other cases, predators and competition for food from other animals complicate the picture.

Text B

The Problems of Technology¹

*Will mankind murder Mother Earth or will he **redeem** her? He could murder her by misusing his increasing technological **potency**.*

Arnold J. Toynbee (1889–1975)

- 1 To many people, technology and development are **synonymous**. Technology is what makes economic growth and social change happen. It has in many real ways made life more comfortable, stimulating, and free of **drudgery**. But the relationship between technology and development is a complicated one. At times the negative features of technology seem to **outweigh** the positive features, which can cause a society to change in some very undesirable ways.
- 2 Short-term benefits can lead to the tragedy of the **commons**. The global commons today are those parts of the planet that are used by many or all nations: the oceans, international river systems, the seabed, the atmosphere, and outer space. Technology can give some nations an advantage over others in exploiting these commons and it is clearly in their short-term interest to do so.
- 3 Take for example the commercial fishing in the world's oceans. Technology has made possible bigger and more powerful fishing boats, equipped with **sonar** to locate schools of fish. It has also led to the creation of huge drift nets — some up to 40 miles long — which critics claim were used to “strip mine”² the seas. These nets allowed a relatively small number of fishermen to catch large quantities of fish. New technology also allows trawlers³ to drag **dredges** the size of football fields over the bottom, scraping it clean. Ninety percent of all large predator fish such as sharks, **swordfish** and **tuna** have been caught and there are fewer different kinds of fish in the oceans than before, putting **ecosystems** at more risk when they are confronted with disruptions such as climate change. There is every indication that many fisheries worldwide are being overfished and are threatened with collapse. If this is not controlled, all nations using the oceans for fishing will be hurt. Not only will their fishing industries be hurt, but unique forms of life on earth will probably become extinct.
- 4 Without a knowledge of ecology, we are tempted to use technology to solve a single problem. But usually we cannot change one part of the human environment without in

1 The materials of the text are selected from *Global Issues* edited by John L. Seitz, Blackwell Publishing Ltd., 2008.

2 strip mine: (*AmE*) to open a very large hole in the ground to remove metal, coal etc. from the earth 露天开采

3 trawler [ˈtrɔːlə]: a large boat that uses a wide cone-shaped net to catch fish 拖网渔船

some way affecting other parts. Often these other effects are harmful, and often they are completely unanticipated, as is nicely illustrated by the situation that occurred in Borneo¹. There, the efforts of health officials to destroy **malaria**-carrying mosquitoes by spraying houses with DDT² led to the collapsing of the roofs of village houses and to the need to **parachute** cats into the villages.

- 5 Shortly after the spraying, the roofs of the natives' houses began to fall because they were being eaten by **caterpillars**, which, because of their particular habits, had not absorbed very much of the DDT themselves. A certain predatory wasp, however, which had been keeping the caterpillars under control, had been killed off in large numbers by the DDT. But the story doesn't end here, because they brought the spraying indoors to control **houseflies**. Up to that time, the control of houseflies was largely the job of a little lizard, the **gecko**, that inhabits houses. Well, the geckos continued their job of eating flies, now heavily **dosed** with DDT, and the geckos began to die. Then the geckos were eaten by house cats. The poor house cats at the end of this food chain had concentrated this material, and they began to die. And they died in such numbers that rats began to invade the houses and consume the food. But, more important, the rats were potential plague carriers. This situation became so alarming that they finally **resorted to** parachuting fresh cats into Borneo to try to restore the balance of populations that the people, **trigger-happy** with the spray guns, had destroyed.

Source: "Ecology: The New Great Chain of Being," *Natural History*, 77 (December 1968)

- 6 The use of DDT in other areas has also had major unanticipated effects since it is **persistent** and poisonous to many forms of life.
- 7 The unanticipated consequences of the use of technology also occur on factory farms. Techniques adopted to raise **poultry**, pigs, veal calves, and cattle allow large numbers of animals to be raised in a relatively small space. The crowding of many animals in a small space and the **confinement** of individual animals in small **stalls** creates stress, frustration, and boredom in the animals. Stress can lower the natural defenses of the animals to diseases, and the crowded conditions **facilitate** the rapid spreading of diseases among the animals. It is common in the US for factory-raised animals to receive large doses of **antibiotics** in their feed to prevent the outbreak of diseases and to promote growth.
- 8 There is now evidence that the abundant use of antibiotics in animal food is creating bacteria that are resistant to treatment by modern drugs and that these bacteria can cause illness in humans. Researchers in the US reported that antibiotic-

1 Borneo [ˈbɒniəu]: an island of the western Pacific Ocean in the Malay Archipelago between the Sulu and Java seas southwest of the Philippines 婆罗洲

2 DDT: abbreviation for dichloro-diphenyl-trichloroethane 一种杀虫剂, 对人畜有害

resistant bacteria were widespread in meats and poultry sold in the country and could be found in consumers' **intestines**. This means that many food-borne illnesses will not respond to the usual treatments and that some may be resistant to all current drugs.

- 9 In US society, which makes wide use of technology, there is a belief in “technological fix”: the problems that science and technology have created can be solved by more science and technology. There are, however, a number of serious problems confronting humans which seem to have no technological solution.
- 10 One example to illustrate the limits to the technological fix is nuclear weapons. The nuclear arms race between the Soviet Union and the United States after World War II threatened the world with a **holocaust** beyond comprehension. Many believed that technology would solve this problem; all that was needed to gain security was better weapons and more weapons than the other side. But the history of the arms race, which lasted nearly half a century, clearly shows that one side's advantage was soon matched or **surpassed** by new weapons on the other side. **Momentary** feelings of security by one nation were soon replaced by deepening insecurity felt by both nations as the weapons became more **lethal**. So the race went on. Today, in addition to the United States and Russia, Britain, France, China, India, and Pakistan have nuclear weapons. The achievements of weapons technology by all the nations have brought the survival of human life into question.
- 11 Although technology has benefited human beings in countless ways, and its use is largely responsible for the high living standards in the industrialized nations, it is necessary to bring a healthy caution to the use of technology. An ignoring of the negative potential of technology has brought harm to people in the past and could cause **unprecedented** harm in the future.

New Words and Phrases

★ antibiotic	[.æntɪbaɪ'ɒtɪk]	<i>n.</i>	抗菌素, 抗生素 (常作复数)
◆ caterpillar	['kætəpɪlə]	<i>n.</i>	毛虫, 蝶或蛾的幼虫
◆ commons	['kɒmənz]	<i>n.</i>	公共资源
confinement	[kən'faɪnmənt]	<i>n.</i>	限制; 禁闭
dose	[dəʊs]	<i>vt.</i>	给……一定剂量的药
		<i>n.</i>	剂量, 一服, 一剂
◆ dredge	[dredʒ]	<i>n.</i>	挖泥机
◆ drudgery	['drʌdʒəri]	<i>n.</i>	苦差事, 苦工
★ ecosystem	['i:kəʊsɪstəm]	<i>n.</i>	生态系统

facilitate	[fə'siliteit]	<i>vt.</i>	使容易; 促进
◆ gecko	['gekəʊ]	<i>n.</i>	壁虎
◆ holocaust	['hɒləkɔ:st]	<i>n.</i>	大屠杀; 大破坏
◆ housefly	['hausflai]	<i>n.</i>	家蝇
◆ intestine	[in'testɪn]	<i>n.</i>	肠 (常作复数)
◆ lethal	['li:θl]	<i>a.</i>	致命的
▲ malaria	[mə'leəriə]	<i>n.</i>	疟疾
★ momentary	['məʊməntəri]	<i>a.</i>	短暂的; 瞬间的
outweigh	[aʊt'wei]	<i>vt.</i>	在价值、重要性或重量上超过……
★ parachute	['pærəʃu:t]	<i>vt. & vi.</i>	用降落伞空投 (某物)
★ persistent	[pə'sistənt]	<i>a.</i>	持久存在的, 不易消失的
▲ potency	['pəʊtnsi]	<i>n.</i>	力量; 潜力
★ poultry	['pɒltrɪ]	<i>n.</i>	家禽肉
▲ redeem	[ri'di:m]	<i>vt.</i>	解救; 补偿
▲ sonar	['səʊnɑ:]	<i>n.</i>	声纳装置
◆ stall	[stɔ:l]	<i>n.</i>	牲畜栏
★ surpass	[sə'pɑ:s]	<i>vt.</i>	优于; 超过
swordfish	['sɔ:dfɪʃ]	<i>n.</i>	剑鱼
▲ synonymous	[si'nɒniməs]	<i>a.</i>	同义的
◆ trigger-happy	['trɪgə'hæpi]	<i>a.</i>	爱乱开枪的; 好动武的
◆ tuna	['tju:nə]	<i>n.</i>	金枪鱼
★ unprecedented	[ʌn'presɪdntɪd]	<i>a.</i>	无前例的; 前所未有的

resort to

求助于, 诉诸

Exercises

Text Comprehension

I. Answer the following questions according to the text.

1. How has technology changed our life positively?
2. What is wrong with the commercial fishing in the world's oceans?
3. Why is it necessary to parachute cats into the villages of Borneo?
4. Why are large doses of antibiotics applied on factory farms?

5. What is “technological fix”? Why is it not true?

II. Discuss the following topics with your classmates.

1. Competition can help promote development and creation. What do you think of arms race?
2. Besides nuclear weapons, are there any other problems that can't be solved by technology itself?
3. Do you think it is the fault of technology for the problems discussed in the text? Why or why not?

Language Focus

I. Complete the following sentences with appropriate words given in the box.

Change the form when necessary.

parachute	outweigh	dose	potential	consume
extinct	redeem	tempt	concentrate	collapse

1. He _____ himself with medicines to stop the cold from getting worse.
2. After an improper speech about racial problems, the minister _____ himself in the eyes of the public by resigning.
3. After careful assessment, they decided that the risks are vastly _____ by the potential benefits.
4. As a lot of houses were damaged in the earthquake, the walls were strengthened to protect them from _____.
5. Many fisheries worldwide are being overfished and some unique forms of life will therefore become _____.
6. He was _____ into a life of crime by greed for fame and fortune, and ended up in prison.
7. As all the major roads had been severely damaged, supplies were _____ into the earthquake zone.
8. To maintain peace and social stability, the Government plans to _____ on new industries in areas of high unemployment.
9. Electric power is not as “green” as some people advocated, for the electricity industry _____ large amounts of fossil fuels.
10. He studied the German market to find the _____ there for profitable investment.

II. Choose the best word given in the brackets to complete each of the following sentences.

1. Technology can give some more advanced nations an advantage _____ others

- in exploiting the commons of the whole world. (against; beyond; over)
- The local people are cutting down the trees, killed off wild animal for farming which is only _____ their short-term interest though it may bring them disastrous effect on the environment in the end. (to; in; on)
 - The research on sea animals is now well equipped with modern technology such as sonar which can locate _____ of dolphins at sea. (flocks; packs; schools)
 - Experimental data are used to _____ the application techniques as well as to demonstrate the validity of the approach. (illustrate; infer; decorate)
 - The labor representatives threatened that if negotiations failed they would have to _____ strike action. (lead to; resort to; plead to)
 - The reduction in available currency and credit leads to _____ decrease in the level of consumer prices and the increase in the purchasing power of money. (persistent; resistant; vibrant)
 - In the domestic automobile market, some usual international practices have been _____ such as payment by installment. (adapted; adjusted; adopted)
 - Although regular exercises can help keep us fit, a balanced diet cannot be neglected as a poor one can _____ one's resistance to illness. (lower; encounter; decline)
 - There is evidence indicating that some bacteria are resistant to treatment by modern drugs due to _____ use of antibiotics in animal food. (large; generous; abundant)
 - In spite that Jeanne liked Simon who is handsome and intelligent, she considered him as a friend and did not want the relationship to _____. (widen; heighten; deepen)

III. Paraphrase the underlined part of each of the following sentences.

- To many people, technology and development are synonymous which is not necessarily true.
- Technology has in many real ways made life more comfortable and free of drudgery.
- The stores are advertising discounts of up to 70% on a variety of their products in the Christmas season which attracts a lot of customers.
- New technology allows travelers to drag dredges the size of football fields over the bottom, scraping it clean.
- A good speaker is able to anticipate an audience's needs and concerns, which is essential to the success of a speech.
- The existence of predatory animals such as lions and leopards help keep the

vegetarians like zebras and antelopes under control on the grassland.

7. The predatory wasps killed off by DDT contributed to the collapse of roofs, and this is not the end of the story because cats killed by the chemical later led to the plague of rats.
8. Long confinement to bed has not only impaired the function of her ankles but made her greatly depressed.
9. The new trade agreement is welcomed by most of the countries as it should facilitate more rapid economic growth.
10. I had heard about the impressive Yellow Mountain, but the beauty of the scenery surpassed all my expectations when I was really there.

Text C

Public Attitudes Towards Science

By Stephen Hawking

Professor Hawking thinks it important to keep everybody in touch with what science is about. In this article he explains why and how.

- 1 Whether we like it or not, the world we live in has changed a great deal in the last hundred years, and it is likely to change even more in the next hundred. Some people would like to stop these changes and go back to what they see as a purer and simpler age. But as history shows, the past was not that wonderful. It was not so bad for a **privileged** minority, though even they had to do without modern medicine, and childbirth was highly risky for women. But for the vast majority of the population, life was nasty, **brutish**, and short.
- 2 Anyway, even if one wanted to, one couldn't put the clock back to an earlier age. Knowledge and techniques can't just be forgotten. Nor can one prevent further advances in the future. Even if all government money for research were cut off (and the present government is doing its best), the force of competition would still bring about advances in technology. Moreover, one cannot stop **inquiring** minds from thinking about basic science, whether or not they are paid for it. The only way to prevent further developments would be a global state that **suppressed** anything new, and human **initiative** and inventiveness are such that even this wouldn't succeed. All it would do is to slow down the rate of change.

- 3 If we accept that we cannot prevent science and technology from changing our world, we can at least try to **ensure** that the changes they make are in the right directions. In a democratic society, this means that the public needs to have a basic understanding of science, so that it can make **informed** decisions and not leave them in the hands of experts. At the moment, the public is in two minds about science. It has come to expect the **steady** increase in the standard of living that new developments in science and technology have brought to continue, but it also distrusts science because it doesn't understand it. This distrust is evident in the cartoon figure of the mad scientist working in his laboratory to produce a Frankenstein¹. It is also an important element behind support for the Green parties². But the public also has a great interest in science, particularly **astronomy**, as is shown by the large audiences for television series such as *The Sky at Night*³ and for science fiction.
- 4 What can be done to **harness** this interest and give the public the scientific background it needs to make informed decisions on subjects like acid rain, the greenhouse effect, nuclear weapons, and **genetic engineering**? Clearly, the basis must lie in what is taught in schools. But in schools science is often presented in a dry and uninteresting manner. Children **learn** it **by rote** to pass examinations, and they don't see its **relevance** to the world around them. Moreover, science is often taught in terms of **equations**. Although equations are a brief and accurate way of describing mathematical ideas, they frighten most people. When I wrote a popular book recently, I was advised that each equation I included would halve the sales. I included one equation, Einstein's famous equation, $E=mc^2$. Maybe I would have sold twice as many copies without it.
- 5 Scientists and engineers tend to express their ideas in the form of equations because they need to know the precise values of quantities. But for the rest of us, a **qualitative** grasp of scientific concepts is **sufficient**, and this can be conveyed by words and diagrams, without the use of equations.
- 6 The science people learn in school can provide the basic **framework**. But the rate of scientific progress is now so rapid that there are always new developments that have occurred since one was at school or university. I never learned about **molecular** biology or transistors at school, but genetic engineering and computers are two of the developments most likely to change the way we live in the future. Popular books

1 Frankenstein ['fræŋkənstain]: It is from the novel *Frankenstein* by Mary Shelley, which is used to talk about something that someone creates that goes out of control and becomes dangerous, often destroying the person who creates it. 弗兰肯斯坦, 科学怪人

2 Green parties: political parties whose main concern is to protect the environment 绿党

3 *The Sky at Night*: a popular British television programme on astronomy《仰望夜空》节目(BBC广播公司出品)

and magazine articles about science can help to put across new developments, but even the most successful popular book is read by only a small **proportion** of the population. Only television can reach a truly mass audience. There are some very good science programmes on TV, but others present scientific wonders simply as magic, without explaining them or showing how they fit into the framework of scientific ideas. Producers of television science programmes should realize that they have a responsibility to educate the public, not just **entertain** it.

- 7 The world today is filled with dangers, hence the sick joke that the reason we have not been contacted by an **alien** civilization is that civilizations tend to destroy themselves when they reach our stage. But I have sufficient faith in the good sense of the public to believe that we might prove this wrong.

New Words and Phrases

★ alien	['eiliən]	<i>a.</i>	外国的; 外星的; 陌生的
★ astronomy	['əstrənəmi]	<i>n.</i>	天文学
★ brutish	['bru:tɪʃ]	<i>a.</i>	如野兽般的; 粗野的
ensure	[in'ʃuə]	<i>vt.</i>	确定; 担保, 保证
entertain	[,entə'tein]	<i>vt.</i>	娱乐, 使……欢乐; 招待
equation	[i'kweɪʃn]	<i>n.</i>	等式; 相等; 平衡
framework	['freimwɜ:k]	<i>n.</i>	框架; 参照标准; 体系
harness	['hɑ:nɪs]	<i>vt.</i>	利用; 上马具
informed	[in'fɔ:md]	<i>a.</i>	了解情况的; 有知识的
initiative	[i'niʃətɪv]	<i>n.</i>	能动性, 进取心; 初步行动
inquiring	[in'kwaiəriŋ]	<i>a.</i>	爱追根究底的; 寻问的, 打听的
molecular	[mə'lekjulə]	<i>a.</i>	分子的; 由分子组成的
★ privileged	['prɪvəlɪdʒd]	<i>a.</i>	有特权的
proportion	[prə'pɔ:ʃn]	<i>n.</i>	比例; 部分
★ qualitative	['kwɒlɪtətɪv]	<i>a.</i>	性质上的, 质的; 定性的
relevance	['reləvəns]	<i>n.</i>	关联
steady	['stedɪ]	<i>a.</i>	稳定的; 沉着的, 不动摇的
sufficient	[sə'fɪʃnt]	<i>a.</i>	充分的, 足够的
★ suppress	[sə'pres]	<i>vt.</i>	压制, 镇压

genetic engineering

基因工程学

learn... by rote

死记硬背地学习



Exercises

Text Comprehension

I. Answer the following questions according to the text.

1. In the first paragraph, the view of “wonderful past” is countered. What is the function of this part?
2. Why can't the advance of science be stopped?
3. What are the public attitudes toward science? And why is it necessary for them to understand science?
4. What is the situation of science teaching in schools?
5. What are the author's suggestions about keeping the public informed of scientific knowledge?
6. What are the author's concluding thoughts?

II. Discuss the following topics with your classmates.

1. Some people are missing the “good old days” which are purer and simpler compared with modern technologically driven life. Do they have any points sensible?
2. Besides TV, do you have any suggestions for other efficient ways of educating the public about science?
3. In the final part of the essay, Hawking expresses his faith in modern human civilization. Do you have confidence in the future of it? Why or why not?

Language Focus

I. Choose one answer from the four choices marked A, B, C, and D that is closest to the meaning of the underlined part in each of the following sentences.

1. In a world that had suddenly become alien and dangerous, he was her only security.
A. strange B. separate C. mysterious D. unpleasant
2. In the past when life was nasty, brutish and short for the vast majority of population, a privileged minority, however, were much less affected.
A. rich B. wise
C. with great support D. with special right
3. Some opponents criticize the government's new policy that raising taxes will stifle initiative of the small businesses and drive the rich to flee the country.
A. ability to decide and act on one's own

- B. ideas of how to improve production
 C. strategies about marketing
 D. invention of new products
4. For scientists and engineers, the precise values of quantities in science are important, but for the general public, a qualitative grasp of scientific concepts is sufficient.
 A. connected with how much something is
 B. connected with how good something is
 C. relating to safety
 D. relating to benefits
5. TV programmes can reach a much larger proportion of population than articles in magazines or newspapers.
 A. rate of the total B. part of a whole C. number D. ratio
6. The students have learned a lot of theories and concepts at school but see little of their relevance to the world around them.
 A. application B. reactions C. relation D. practice
7. To maintain a peaceful situation of the country, the autocratic government takes various measures to suppress any challenging ideas in the media.
 A. supply B. prevent C. supplement D. cancel
8. Daily, moderate drinking could almost halve the risk of developing Alzheimer's disease or other types of dementia, according to new research.
 A. decrease something greatly
 B. increase something greatly
 C. divide something into two equal parts
 D. reduce something by a half
9. A book full of figures or equations tends to make dry reading.
 A. not interesting B. not wet C. difficult D. valuable
10. Life for our early ancestors was nasty, brutish and short, according to the evidence.
 A. original B. primitive C. savage D. stupid

II. Rewrite each of the following sentences, using the word or phrase given in the brackets.

1. Despite that we can reduce the speed of scientific development, we can never stop it due to the force of competition and human inquiring minds.
 The development of science can't be stopped though _____
 _____ . (slow down)

2. To improve the welfare of the most people the government changed the tax policy and caused a great redistribution of wealth in the country.
For the better welfare of the most people the government _____
_____. (bring about)
3. Only after it has a basic understanding of science and technology can the public decide on their development in a knowledgeable way.
The public has to have a basic understanding of science and technology before it _
_____. (informed)
4. The public is troubled by the hesitation as it looks forward to the benefits brought by the new development of science and technology but also distrusts them.
The public expects benefits brought by the new development of science and technology on the one hand but distrusts them on the other, so it _____
_____. (mind)
5. The great concern for the worsening environment is an important factor for the public to support the activities of the Green parties.
That the public is greatly concerned with the worsening environment is an important element _____
(behind)
6. The public can make wise decisions on the development of science and technology if their interest in it is made good use of.
The public can make wise decisions on the development of science and technology if _____
(harness)
7. Many dams are built to control the river and make good use of its energy for the benefit of humankind.
People built a large number of dams to _____
_____. (harness)
8. Equations are not liked by most people though they are more brief and accurate than words.
Most people are not fond of equations despite _____
_____. (concise)
9. Before expressing an alternative point of view, he listened patiently to what we all had to say.
He listened with patience to what we all had to say before _____
_____. (put across)
10. Hawking urges producers of TV programmes not just to provide people with fun; instead, they should be responsible for educating people with scientific knowledge.

The producers of TV programmes are urged by Hawking to _____
 _____ . (entertain)

Writing 

I. Thesis

A thesis is the statement of the central idea of an essay, usually presented at the introductory part. It is discussed in a logical way and supported with evidence in order to prove that it is true. The statement of a thesis tells readers an essay’s topic and certain attitude, opinion or idea about the topic. A thesis is important because the essay is based on the point it states. It is an essential part of all types of essays.

Example:

Owning a pet has several important benefits.

In the sentence, “owning a pet” is a topic while it “has several important benefits” is an opinion about the topic. Now observe the following examples to see how a topic can be narrowed down to be an appropriate thesis for writing.

General	Limited	Thesis
Travel	Backpacking	Backpacking can be an inexpensive and pleasurable outdoor adventure.
Family	Single-parent family	Children raised in single-parent families can be more independent.
Sports	Basketball	Basketball can help us develop the skill of teamwork and create good interpersonal relations.

 **Exercises**

- The topic of Text A is “The Mystery of Shrinking Sheep”. What is the thesis of it?

- Look carefully at the ten general subjects and ten limited subjects below. Then write thesis statements for any five of them.

Hint *To create a thesis statement for a limited subject, ask yourself, “What point do I want to make about _____ (my limited subject)?”*

General Subject	Limited Subject
1) dormitory	1) sharing a dormitory with roommates
2) self-improvement	2) social ability
3) family	3) parental love
4) eating	4) cooking my favorite food
5) automobiles	5) the change it may bring us
6) health	6) regular exercise
7) owning a house	7) the burden of keeping a house
8) basketball	8) teamwork
9) friendship	9) the significance of a friend
10) pollution	10) air pollution

Thesis statements for five of the limited subjects:

3. Write a thesis for each group of supporting statements. This activity will offer you the practice in writing an effective essay thesis — one that is neither too broad nor too narrow. It will also help you understand the logical relationship between a thesis and its supporting details.

1) Thesis: _____

- a. English has continued as one of the important languages of commerce and diplomacy in the world due to the political and economic influence of the English-speaking nations.
- b. English is the language of the majority of published materials in the world so that education has come to rely heavily on an understanding of English.
- c. Learning English as a second language can extend our vision and expand the mind.

2) Thesis: _____

- a. When we are young we live happily under the shelter of parents, free from hunger or cold.
- b. As we grow up we find life partners and set up our own homes which can help us get refreshed after an exhausting day at work or a long tiring journey.
- c. Finally, when we get retired, we may enjoy the rest of our life peacefully at home with our children or even with our parents.