

For Teachers: Please have the students read the sentences one at a time and correct their pronunciation of each sentence then have them repeat after you. Wait until after they read the sentence (use the number in place of the missing word) to have the students choose the correct answer to fill in the blank. When the students finish the article, move on to the further questions.

4[B] – Lessons from the Ozone Hole

11.2(4B) A2E

- In May 1985, ^{科学者(かがくしゃ)たち} scientists ^{イギリスの} from the British ^{南極(なんきょく)} Antarctic ^{調査(ちょうさ)} Survey ^{衝撃(しょうげき)をあたえた} shocked ^{発表(はっぴょう)により} the world ^{発見(はっけん)} by announcing ^{巨大(きょだい)な} the discovery of a huge ^{オゾン層(そう)} hole in ^{~の上(うえ)} the ozone layer ^{南極(なんきょく)} above the Antarctic.
- Ozone is a ^{ガス} gas usually ^{形成(けいせい)された} formed ^{酸素(さんそ)} from oxygen that is high in the earth's ^{大気(たいき)} atmosphere.
- The ozone layer is ^{なくてはならない} essential to ^{生命(せいめい)} life ^{惑星(わくせい)} on our planet ^{守(まも)る} because it protects us ^{有害(ゆうがい)な} from harmful ^{紫外線(しがいせん)} ultraviolet rays ^{もたらされる} produced by the sun.
- Without the ozone layer, these ^{光線(こうせん)} rays would ^{~の原因(げんいん)となる} cause ^{がん} cancer and other ^{病気(びょうき)} diseases ^{人間(にんげん)} in both human beings and animals.

Further Questions&A * Ask student to answer the question on their own at first. If the student can't answer correctly, have him look at the last page and read the "example answer" for the question. Have the student try to memorize the answer, if it's too long or difficult, you should divide the sentence into 2 or 3 parts to make it easier to remember. Once they have memorized the answer, the teacher should ask the question one last time so that the student can practice answering. Also if you find any mistakes, please mark the page and let me know ASAP.

- 1) What did the British Antarctic Survey ^{~を発見(はっけん)する} discover ?
- British Antarctic Survey ^{なに} は何を ^{はっけん} 発見しましたか。
- They discovered a huge hole in the ozone layer.*
- 2) Why is the ozone layer ^{なくてはならない} essential to life? ^{そう} なぜオゾン層 ^{せいかつ} は生活に ^か 欠かせないのですか。
- Because it protects us from harmful ultraviolet rays produced by the sun.*
10. The world's ^{反応(はんのう)} reaction to the scientists' ^{発見物(はっけんぶつ)} discovery ^{びっくりするような} was surprisingly quick. ^{速(はや)さ}
11. ^{情報(じょうほう)} Data ^{示(しめ)した} showed that ^{オゾンホール} the ozone hole ^{つくられた} had been created by gases called ^{フロンガス} chlorofluorocarbons (CFCs), which were ^{幅広(はばひろ)く用(もち)いられた} widely used ^{~のような} in machines ^{エアコン} such as air conditioners ^{冷蔵庫(れいぞうこ)} and refrigerators.
12. By 1988, 46 governments had ^{署名(しよめい)した} signed ^{モントリオール(カナダ)} the Montreal ^{議定書(ぎていしよ)} Protocol, a ^{条約(じょうやく)} treaty ^{禁止(きんし)した} that banned ^{使用(しよう)} the use of these gases.
13. ^{結局(けっぎょく)} Eventually, this treaty was ^{~によって署名(しよめい)された} signed by ^{すべての加盟国(かめいにく)} every member country of ^{国際連合(こくさいれんごう)} the United Nations—the only ^{条約(じょうやく)} treaty ^{これまでに} ever to be signed by so many ^{国(くに)} nations.

14. It will be a long time before the ozone hole ^{消(き)え失(う)せる 完全(かんぜん)に} disappears completely, but it soon ^{増大(ぞうだい)する} stopped growing .
15. ^{説得(せつとく)する} Persuading the international ^{共同体(きょうどうたい)} community to ^{取(と)り入(い)れる} adopt the Montreal ^{議定書(ぎていしよ)} Protocol was ^{熟考(じゅっこう)された} considered to be a great ^{業績(いぎよう)} achievement for the ^{環境(かんきよう)の 運動(うんどう)} environmental movement.

Further Questions&A

16. 3) What was the hole in the ozone layer caused by? ^{そう あな げんいん} オゾン層の穴の原因はなんですか。
It was created by gasses ^{~と呼(よ)ばれた フロンガス} called CFCs.
17. 4) What was so ^{驚(おどろ)くべき} amazing about the Montreal Protocol?
18. Montreal Protocol の ^{おどろ} 驚くべきことはなんですか。
 ~によってサインされた
19. *It was signed by every member country of the United Nations.*

20. According to scientists, there were two reasons why people responded so quickly to the ^{危険(きけん)なもの} danger .
21. The first was that it was easy to ^{理解(りかい)する} understand. If the hole ^{~し続(つづ)けた 増大(ぞうだい)する} kept growing , it would ^{~に驚異(きょうい)をあたえる} threaten ^{あらゆる場所(ばしょ)} life everywhere.
22. The second reason was that it was easy to ^{代替(だいたい)フロンガス} replace the CFCs with ^{少ない 損害(そんがい)} hydrochlorofluorocarbons (HCFCs), gases that do much less damage to the ozone layer.
23. ^{不幸(ふこう)にも} Unfortunately, though, HCFCs have their own problems. ^{しかし} Not only do they ^{助長(じょちょう)する} contribute to ^{地球温暖化(ちきゅうおんだんか)} global warming , but they may also be a ^{~だけでなく} major ^{重要(じゅうよう)な 要因(よういん)} factor in the development of ^{発達(はったつ) 酸性雨(さんせいりゅう)} acid rain .

* HCFCs= hydrochlorofluorocarbons = ヒドロクロロフルオロカーボン

^{おんだんかげんしょう げんいん} 温暖化現象の原因となりうるフロンガスの代わりにとして、^{はんどうたい せいぞうかてい れいぞうこ} 半導体の製造過程や冷蔵庫などに利用されている物質。ハイドロフルオロカーボンやパーフルオロカーボン、^{ろく かいおう} 六フッ化硫黄などがある。

Further Questions&A

24. 5) What was one reason people ^{反応(はんのう)した} responded so quickly to the danger?
25. ^{ひとびと} 人々がこの危険に ^{さききゅう} 早急に ^{はんのう} 反応した 1 つの理由 ^{りゆう} はなんですか。
 脅威(きょうい)を与(あた)える
26. *If the hole kept growing it would threaten life everywhere.*
27. *It was easy to replace the CFCs with HCFCs which do much less damage.* ^{取(と)り替(か)える} ^{より少(すく)ない}
28. 6) What are problems with HCFCs? ^{もんだい} HCFCs の問題はなんですか。
29. ^{助長(じょちょう)する} They contribute to global warming and they may be a major ^{要因(よういん)} factor in the development of acid rain.

30. Does this mean that the ^{禁止(きんし)} ban on CFCs was a bad idea? The ozone hole was

禁止事項(きんしじこう)がなければ 覆(おお)う
 a real danger and, without the ban, it would have quickly grown to cover
 全体(ぜんたい) 惑星(わくせい)
 the whole planet.

31. Stopping its growth was a major victory.
 増大(ぞうだい) 重要(じゅうよう)な 勝利(しょうり)
 それにもかかわらず 困難(こんなん) どれほど 複雑(ふくざつ)な

32. Nevertheless, the difficulties caused by HCFCs show how complicated
 環境(かんきょう)の なりえる
 environmental problems can be.

33. Above all, they demonstrate how important it is for us to find a way to
 制御(せいぎょ)する 主な 原因(げんいん) 有害(ゆうがい)な
control the main cause of global warming—the harmful gases that
 加(くわ)えること 大気(たいき)
we keep putting into the atmosphere.

Further Questions&A

34. 7) What would have happened had the ban not happened?
 起(おこ)った

35. もしこの禁止令(きんしれい)がなかったらどのようなことが起(おこ)ったでしょうか。

It would have quickly grown to cover the whole planet.
 覆(おお)う 全惑星(ぜんわくせい)

36. 8) What did the HCFCs demonstrate? HCFCs が 証明(しょうめい)していることはなんですか。

37. *They demonstrated it is important for us to find a way to control harmful gases we put into the atmosphere.*

38. (37) The ozone layer is important because it オゾン層は重要(じゅうよう)である。なぜならそれは...

39. 1 helps preserve the oxygen necessary for life.
 保護(ほご)する 酸素(さんそ) 必要(ひつよう)な

40. 2 protects us from rays that can cause serious diseases.
 重大(じゅうだい)な 病気(びょうき)

41. 3 allows us to calculate the amount of pollution in the air.
 私達(わたしたち)に~させる 計算(けいさん)する 総計(そうけい) 汚染(おせん) 空气中(くうきちゅう)の

42. 4 stops the earth's atmosphere from being damaged by the sun.

43. (38) Why was the Montreal Protocol seen as a great success for the
 モントリオール議定書(ぎていしよ) ~とみられていた 成功(せいこう)
 環境保護運動(かんきょうほごうんどう)
 environmental movement?

44. Montreal Protocol is a great success for the environmental movement.
 モントリオール議定書(ぎていしよ)は環境保護運動(かんきょうほごうんどう)において素晴らしい成功(せいこう)だったのみられていたのはなぜですか。
 政府(せいふ)が~する事(こと)を強制(きょうせい)する 研究(けんきゅう)

45. 1 It forced governments to do more research on the ozone layer.

46. 2 It provided data showing that CFCs created the ozone hole.
 提供(ていきょう)した 示(しめ)す フロンガスが~をつかった

47. 3 It attracted attention to the damage being done to nature.
 注意(ちゅうい)をひきつけた 損傷(そんしょう) 行(おこな)われている

48. 4 It was agreed to be more countries than any other treaty.
 意見(いけん)が一致(いっち)した より多(おほ)くの~ 他(た)のどの国の条約(じょうやく)より

49. (39) What was one reason CFCs could be banned so quickly?
 法律(ほうりつ)で禁止(きんし)された

50. フロンガスがそれほど速(はや)く禁止(きんし)された一つの理由(りゆう)は何(なん)ですか。

51. 1 Scientists were becoming concerned about acid rain.
 心配(しんぱい)した 酸性雨(さんせいう)

52. 2 People recognized that global warming was a real problem.
 ~を認(みと)めた 現実(げんじつ)の

53. 3 A gas that was not as harmful to the ozone layer was available.
 有害(ゆうがい)なほどではない 利用可能(りようかのう)な

54. 4 They were being produced ^{生産(せいさん)されていた} in only a few places ^{世界中(せかいじゅう)で} around the world.

55. (40) The ban on CFCs ^{フロン(フロン)の禁止(きんし)} was a good idea because ^{フロン(フロン)の禁止(きんし)がよい案(あん)だったのは...}

56. 1 it led ^{~へ導(みちび)いた} to a reduction ^{削減(さくげん)} in global warming.

57. 2 it saved ^{救(すく)った} the planet ^{惑星(わくせい)} from a serious ^{脅威(きょうい)となるもの} threat.

58. 3 it reduced the amount of ^{代替(だいたい)フロン} HCFCs in the air.

59. 4 it showed ^{示(しめ)した} how complicated ^{どれほど} nature is. ^{複雑(ふくざつ)な}

Review Questions

60. 1) What did the ^{イギリスの} British Antarctic Survey ^{~を発見(はっけん)する} discover?

61. *They discovered a huge hole in the ozone layer.*

62. 2) Why is the ozone layer ^{なくてはならない} essential to life?

63. *Because it protects us from ^{守(まも)る} harmful ^{有害(ゆうがい)な} ultraviolet ^{光線(こうせん)} rays ^{~によって作(つく)られた} produced by the sun.*

64. 3) What was the hole in the ozone layer caused by?

65. *It was created by gasses ^{~と呼(よ)ばれた} called ^{フロンガス} CFCs.*

66. 4) What was so amazing about the Montreal Protocol?

67. *It ^{~によってサインされた} was signed by every member country of the United Nations.*

68. 5) What was one reason people responded so quickly to the danger?

69. *If the hole kept growing it would ^{脅威(きょうい)を与(あた)える} threaten life everywhere.*

70. *It was easy to ^{取(と)り替(か)える} replace the CFCs with HCFCs which do much ^{より少(すく)ない} less damage.*

71. 6) What are problems with HCFCs?

72. *They ^{助長(じょちょう)する} contribute to global warming and they may be a major ^{要因(よういん)} factor in the development of acid rain.*

73. 7) What would have happened had the ban not happened?

74. *It would have quickly grown to ^{覆(おお)う} cover ^{全惑星(ぜんわくせい)} the whole planet.*

75. 8) What did the HCFCs demonstrate?

76. *They demonstrated it is important for us to find a way to control harmful gases we put into the atmosphere*