

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.

日本語訳なしタイプＢもございます。スクロールダウンするとございますのでお好きな方をご利用下さい。

4[B] – Lessons from the Ozone Hole

 11.2(4B) A2E

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

British Antarctic Survey は何（なに）を発見（はっけん）しましたか。

They discovered a huge hole in the ozone layer.

2) Why is the ozone layer essential（なくてはならない） to life? なぜオゾン層（そう）は生活（せいかつ）に欠（か）かせないのですか。

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

The world's reaction（反応（はんのう）） to scientists' discovery（発見物（はっけんぶつ）） was surprisingly（びっくりするような） quick（速（はや）さ）. Data（情報（じょうほう）） showed（示（しめ）した） that the ozone hole（オゾンホール） had been created（つくられた） by gases called chlorofluorocarbons（フロンガス） (CFCs), which were widely used（幅広（はばひろ）く用（もち）いられた） in machines such as（～のような） air conditioners（エアコン） and refrigerators（冷蔵庫（れいぞうこ））. By 1988, 46 governments（政府（せいふ）） had signed（署名（しょめい）した） the Montreal（モントリオール（カナダ）） Protocol（議定書（ぎていしょ））, a treaty（条約（じょうやく）） that banned（禁止（きんし）した） the use（使用（しよう）） of these gases. Eventually（結局（けっきょく））, this treat way（取（と）り扱（あつか）い方法（ほうほう）） signed by（～によって署名（しょめい）された） every member country（すべての加盟国（かめいこく）） of the United Nations（国際連合（こくさいれんごう））—the only treaty（条約（じょうやく）） ever（これまでに） to be signed by so many nations（国（くに））. It will be a long time before the ozone hole disappears（消（き）え失（う）せる） completely（完全（かんぜん）に）, but it soon stopped growing（増大（ぞうだい）する）. Persuading（説得（せっとく）する） the international community（共同体（きょうどうたい）） to adopt（取（と）り入（い）れる） the Montreal（モントリオール） Protocol（議定書（ぎていしょ）） was considered（熟考（じゅっこう）された） to be a great

24. achievement (偉業（いぎょう）) for the environmental (環境（かんきょう）の) movement (運動（うんどう）).

Further Questions&A

25. 3) What was the hole in the ozone layer caused by? オゾン層(そう)の穴(あな)の原因(げんいん)はなんですか。

It was created by gasses (～と呼（よ）ばれた) called (フロンガス) CFCs.

26. 4) What was so amazing (驚（おどろ）くべき) about the Montreal Protocol?

27. Montreal Protocol の驚(おどろ)くべきことはなんですか。

28. *It (～によってサインされた) was signed by every member country of the United Nations.*

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29. According to (～によれば) scientists, there were two reasons (理由（りゆう）) why people responded (答（こた）えた) so

30. quickly to the danger (危険（きけん）なもの). The first was that it was easy to understand (理解（りかい）する). If the

31. hole kept (～し続（つづ）けた) growing (増大（ぞうだい）する), it would threaten (～に驚異（きょうい）をあたえる) life everywhere (あらゆる場所（ばしょ）).

32. The second reason was that it was easy to replace (取（と）り替（か）える) the CFCs with

33. *hydrochlorofluorocarbons (代替（だいたい）フロンガス) (HCFCs), gases that do much less (少ない) damage (損害（そんがい）) to the

34. ozone layer. Unfortunately (不幸（ふこう）にも), though (しかし), HCFCs have their own problems. Not only (～だけでなく)

35. do they contribute (助長（じょちょう）する) to global warming (地球温暖化（ちきゅうおんだんか）), but they may also be a major (重要（じゅうよう）な)

36. factor (要因（よういん）) in the development (発達（はったつ）) of acid rain (酸性雨（さんせいう）).

*HCFCs= hydrochlorofluorocarbons =ヒドロクロロフルオロカーボン
温暖化現象(おんだんかげんしょう)の原因(げんいん)となりうるフロンガスの代(か)わりにとして、半導体(はんどうたい)の製造過程(せいぞうかてい)や冷蔵庫(れいぞうこ)などに利用(りよう)されている物質(ぶっしつ)。ハイドロフルオロカーボンやパーフルオロカーボン、六フッ化硫黄(ろくかいおう)などがある。

Further Questions&A

37. 5) What was one reason people responded (反応（はんのう）した) so quickly to the danger?

38. 人々(ひとびと)がこの危険(きけん)に早急(さっきゅう)に反応(はんのう)した１つの理由(りゆう)はなんですか。

39. ① *If the hole kept growing it would threaten (脅威（きょうい）を与（あた）える) life everywhere.*

40. ② *It was easy to replace (取（と）り替（か）える) the CFCs with HCFCs which do much less (より少（すく）ない) damage.*

41. 6) What are problems with HCFCs? HCFCs の問題(もんだい)はなんですか。

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

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43. Does this mean (これは～の意味（いみ）ですか) that the ban (禁止（きんし）) on CFCs was a bad idea? The ozone hole was a

44. real danger and, without the ban (禁止事項（きんしじこう）がなければ), it would have quickly grown to cover (覆（おお）う) the

45. whole (全体（ぜんたい）) planet (惑星（わくせい）). Stopping its growth (増大（ぞうだい）) was a major (重要（じゅうよう）な) victory (勝利（しょうり）).

46. Nevertheless (それにもかかわらず), the difficulties (困難（こんなん）) caused by HCFCs show how (どれほど) complicated (複雑（ふくざつ）な)

47. environmental (環境（かんきょう）の) problems can be (なりえる). Above all (とりわけ), they demonstrate (実証（じっしょう）する) how important it

48. is for us to find a way to control (制御（せいぎょ）する) the main (主な) cause (原因（げんいん）) of global warming—the

49. harmful (有害（ゆうがい）な) gases that we keep putting into (加（くわ）えること) the atmosphere (大気（たいき）).

Further Questions&A

50. 7) What would have happened (起こった) had the ban not happened?
51. 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 (覆う) the whole planet (全惑星).
52. 8) What did the HCFCs demonstrate (証明する)? HCFCsが証明(しょうめい)していることはなんですか。
53. *They demonstrated it is important for us to find a way to control harmful gases we put into the atmosphere.*

54. (37) The ozone layer is important because it オゾン層は重要(そうじゅうよう)である。なぜならそれは…
55. 1 helps preserve (保護する) the oxygen (酸素) necessary (必要な) for life.
56. 2 protects us from rays that can cause serious (重大な) diseases (病気).
57. 3 allows us (私達に～させる) to calculate (計算する) the amount (総計) of pollution (汚染) in the air (空気中の).
58. 4 stops the earth's atmosphere from being damaged by the sun.

59. (38) Why was the Montreal Protocol (モントリオール議定書) seen as (～とみられていた) a great success (成功) for the environmental movement (環境保護運動)?
60. モントリオール議定書(ぎていしょ)は環境保護運動(かんきょうほごうんどう)において素晴(すば)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。
61. 1 It forced governments (政府が) to (～する事を強制する) do more research (研究) on the ozone layer.
62. 2 It provided (提供した) data showing (示す) that CFCs created (フロンガスが～をつくった) the ozone hole.
63. 3 It attracted attention (注意をひきつけた) to the damage (損傷) being done (行われている) to nature.
64. 4 It was agreed (意見が一致した) to be more (より多くの～) countries than any other treaty (他のどの国の条約より).

65. (39) What was one reason CFCs could be banned (法律で禁止された) so quickly?
66. フロンガスがそれほど速(はや)く禁止(きんし)された一(ひと)つの理由(りゆう)は何(なん)ですか。
67. 1 Scientists were becoming concerned (心配した) about acid rain (酸性雨).
68. 2 People recognized (～を認めた) that global warming was a real (現実の) problem.
69. 3 A gas that was not as harmful (有害なほどではない) to the ozone layer was available (利用可能な).
70. 4 They were being produced (生産されていた) in only a few places around the world (世界中で).

71. (40) The ban on CFCs (フロンの禁止) was a good idea because フロンの禁止(きんし)が良(よ)い案(あん)だったのは…
72. 1 it led (～へ導いた) to a reduction (削減) in global warming.
73. 2 it saved (救った) the planet (惑星) from a serious threat (脅威となるもの).
74. 3 it reduced the amount of HCFCs (代替フロン) in the air.
75. 4 it showed (示した) how complicated (複雑な) nature is.

Review Questions

76. 1) What did the British (イギリスの) Antarctic Survey discover (～を発見する)?

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

78. 2) Why is the ozone layer essential (なくてはならない) to life?

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

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

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

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

83. *It was signed by (～によってサインされた) every member country of the United Nations.*

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

85. ① *If the hole kept growing it would threaten (脅威（きょうい）を与（あた）える) life everywhere.*

86. ② *It was easy to replace (取（と）り替（か）える) the CFCs with HCFCs which do much less (より少（すく）ない) damage.*

87. 6) What are problems with HCFCs?

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

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

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

91. 8) What did the HCFCs demonstrate?

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

解答: (37) 2 (38) 4 (39) 3 (40) 2

Type B 日本語訳なし

4[B] – Lessons from the Ozone Hole

 11.2(4B) A2E

93. In May 1985, scientists from the British Antarctic Survey shocked the world by
94. announcing the discovery of a huge hole in the ozone layer above the Antarctic.
95. Ozone is a gas usually formed from oxygen that is high in the earth's
96. atmosphere. The ozone layer is essential to life on our planet because it protects
97. us from harmful ultraviolet rays produced by the sun. Without the ozone layer,
98. these rays would cause cancer and other disease in both human beings and
99. animals.

Further Questions&A

100. 1) What did the British Antarctic Survey discover?
101. 2) Why is the ozone layer essential to life?

The world's reaction to scientists' discovery was surprisingly quick. Data showed that the ozone hole had been created by gases called chlorofluorocarbons (CFCs), which were widely used in machines such as air conditioners and refrigerators. By 1988, 46 governments had signed the Montreal Protocol, a treaty that banned the use of these gases. Eventually, this treat way signed by every member country of the United Nations—the only treaty ever to be signed by so many nations. It will be a long time before the ozone hole disappears completely, but it soon stopped growing. Persuading the international community to adopt the Montreal Protocol was considered to be a great achievement for the environmental movement.

Further Questions&A

3) What was the hole in the ozone layer caused by?
4) What was so amazing about the Montreal Protocol?

According to scientists, there were two reasons why people responded so quickly to the danger. The first was that it was easy to understand. If the hole kept growing, it would threaten life everywhere. The second reason was that it was easy to replace the CFCs with*hydro chlorofluorocarbons (HCFCs), gases that do much less damage to the ozone layer. Unfortunately, though, HCFCs have their own problems. Not only do they contribute to global warming, but they may also be a major factor in the development of acid rain.

*HCFCs= hydrochlorofluorocarbons =ヒドロクロロフルオロカーボン
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、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、六フッ化硫黄などがある。

Further Questions&A

5) What was one reason people responded so quickly to the danger?
6) What are problems with HCFCs?

Does this mean that the ban on CFCs was a bad idea? The ozone hole was a real danger and, without the ban, it would have quickly grown to cover the whole planet. Stopping its growth was a major victory. Nevertheless, the difficulties caused by HCFCs show how complicated environmental problems can be. Above all, they demonstrate how important it is for us to find a way to control the main cause of global warming—the harmful gases that we keep putting into the atmosphere.

Further Questions&A

7) What would have happened had the ban not happened?
8) What did the HCFCs demonstrate?

(37) The ozone layer is important because it
1 helps preserve the oxygen necessary for life.
2 protects us from rays that can cause serious diseases.
3 allows us to calculate the amount of pollution in the air.
4 stops the earth's atmosphere from being damaged by the sun.

(38) Why was the Montreal Protocol seen as a great success for the environmental movement?

1 It forced governments to do more research on the ozone layer.
2 It provided data showing that CFCs created the ozone hole.
3 It attracted attention to the damage being done to nature.
4 It was agreed to be more countries than any other treaty.

(39) What was one reason CFCs could be banned so quickly?

1 Scientists were becoming concerned about acid rain.
2 People recognized that global warming was a real problem.
3 A gas that was not as harmful to the ozone layer was available.
4 They were being produced in only a few places around the world.

(40) The ban on CFCs was a good idea because

1 it led to a reduction in global warming.
2 it saved the planet from a serious threat.
3 it reduced the amount of HCFCs in the air.
4 it showed how complicated nature is.

Review Questions

1) What did the British Antarctic Survey discover?
2) Why is the ozone layer essential to life?
3) What was the hole in the ozone layer caused by?
4) What was so amazing about the Montreal Protocol?
5) What was one reason people responded so quickly to the danger?
6) What are problems with HCFCs?
7) What would have happened had the ban not happened?
8) What did the HCFCs demonstrate?

解答: (37) 2 (38) 4 (39) 3 (40) 2