



## Words &amp; Expressions

## Before Reading

<input type="checkbox"/>	1. vertical [vɜːrtɪkl]	形	
<input type="checkbox"/>	2. horizontal [hɔːrəzəl(ɪ)ntl]	形	→ 名 ( )
<input type="checkbox"/>	3. slim [slɪm]	形	
<input type="checkbox"/>	4. colorful [kɒlərfʊl]	形	→ 名 ( )
<input type="checkbox"/>	5. planner [plænə]	名	→ 動 ( )

## Paragraph 1

<input type="checkbox"/>	6. illustration [ɪləstreɪʃən]	名	→ 動 illustrate
<input type="checkbox"/>	7. what is called		

## Paragraph 2

<input type="checkbox"/>	8. historically [hɪstɔːrɪkəli]	副	→ 名 ( )
<input type="checkbox"/>	9. structural [strʌktʃərəl]	形	→ 名 ( )
<input type="checkbox"/>	10. landscape [lændskeɪp]	名	
<input type="checkbox"/>	11. illustrate [ɪləstreɪt]	動	→ 名 illustration
<input type="checkbox"/>	12. incline [ɪnkleɪn]	動	
<input type="checkbox"/>	13. earthen [ɜːθn]	形	→ 名 ( )
<input type="checkbox"/>	14. northern [nɔːθərn]	形	→ 名 ( )
<input type="checkbox"/>	15. factor [fæktə]	名	
<input type="checkbox"/>	16. close to ~		

## Paragraph 3

<input type="checkbox"/>	17. interior [ɪntɪəriə]	名	
<input type="checkbox"/>	18. spacious [speɪʃəs]	形	→ 名 ( )
<input type="checkbox"/>	19. appear to do [be]		

**Paragraph 4**

<input type="checkbox"/>	20. <b>technique</b> [tekni:k]	名	→形 ( )
<input type="checkbox"/>	21. <b>employ</b> [implɔɪ]	動	→名 employee
<input type="checkbox"/>	22. <b>two-dimensional</b> [tu:dimɛnʃənl]	形	
<input type="checkbox"/>	23. <b>three-dimensional</b> [θri:dimɛnʃənl]	形	
<input type="checkbox"/>	24. <b>instance</b> [ɪnstəns]	名	
<input type="checkbox"/>	25. <b>frequently</b> [fri:kwɛntli]	副	→名 ( )
<input type="checkbox"/>	26. <b>significant</b> [sɪgnɪfɪkənt]	形	→名 ( )
<input type="checkbox"/>	27. <b>direction</b> [dərəkʃən]	名	→動 ( )
<input type="checkbox"/>	28. <b>for instance</b>		
<input type="checkbox"/>	29. <b>be of help</b>		
<input type="checkbox"/>	30. <b>in ~ direction</b>		

**Paragraph 5**

<input type="checkbox"/>	31. <b>intersection</b> [ɪntərsɛkʃən]	名	
<input type="checkbox"/>	32. <b>crosswalk</b> [krɔ:swɔ:k]	名	
<input type="checkbox"/>	33. <b>viewpoint</b> [vjú:pɔɪnt]	名	
<input type="checkbox"/>	34. <b>hopefully</b> [hóupfəli]	副	→名 ( )

**Paragraph 6**

<input type="checkbox"/>	35. <b>effectiveness</b> [əfɛktɪvnəs]	名	→名 ( )
<input type="checkbox"/>	36. <b>nonetheless</b> [nʌndðəls]	副	
<input type="checkbox"/>	37. <b>limitation</b> [lɪmətɛɪʃən]	名	→動 ( )
<input type="checkbox"/>	38. <b>keep ~ in mind</b>		

## Content 1,2,3

**1** Look at the **illustration** below. // What do you see? // Some people might see a rabbit / facing to the right, / while others might see a duck / facing to the left. // This illustration shows / how our eyes can be tricked, / **what is called** an optical illusion. // Such illusions have been used / in various ways / which we can see / in our daily lives. //

① check

**2** First, / one example is the manner / in which they have **historically** been incorporated / into **structural** designs. // The *karesansui* (dry **landscape**) garden / at the Zen temple Ryōanji in Kyoto / **illustrates** such a use. // Its surface may look completely level, / but actually, / it **inclines** / towards the garden's south-east corner. // Also, / the west-side **earthen** wall is slightly higher / at its **northern** end. // These **factors** create an optical illusion / that makes this surface look deeper. // This effect is the same / as the one / seen in the Ponzo Illusion (Figure 1), / in which the horizontal line **closer to** the top / looks longer than the line below it, / even though the two are exactly the same length. //

**3** Second, / another optical illusion can be seen / in the picture below, / which shows the **interior** of a house / that **appears to** have an extremely high ceiling. //  ② check // The effect is caused / by the Fick Illusion (Figure 2), / in which the vertical line seems longer / than the horizontal line / despite their lengths being precisely the same. // Using this effect / can make a room look more **spacious** / than it actually is. //

## Key Sentences



1 First, one example is the manner **in which** they have historically been incorporated into structural designs.

▶ 〈前置詞＋関係代名詞〉の形で、先行詞の the mannerが、前置詞の目的語の働きをしている。

訳

2 The effect is caused by the Fick Illusion (Figure 2), in which the vertical line seems longer than the horizontal line despite their lengths **being** precisely the same.

▶ their lengthは being ~の意味上の主語になっている。

訳

## Comprehension

optical illusions

— • how our eyes can be (①) ) • used in our daily lives

first example

the *karesansui* garden at Ryōanji in Kyoto  
historically been incorporated into (②) ) designs

||

{ • surface of the garden → actually (③) ) towards the garden's south-east corner  
• the west-side earthen wall → slightly higher at northern end

↓  
makes the surface look deeper

the (④) ) Illusion

= the (⑤) ) line closer to the top looks longer than the line below it  
even though the two are exactly the same length

second example

→ the (⑥) ) of a house that appears to have extremely high ceiling

the (⑦) ) Illusion

using this effect can make a room look more (⑧) ) than it actually is

= the (⑨) ) line seems longer than the (⑤) ) line

though the lengths of both lines are precisely the same



Choose

vertical / inclines / spacious / interior / structural /  
horizontal / tricked / Ponzo / Fick

## Content 4,5,6

**4** Third, / another **technique employed** recently / is to create, / on a **two-dimensional** surface, / the appearance of a **three-dimensional** object. // In one train station, / for **instance**, / people are **frequently** unable / to find an elevator / located in a blind spot. // To assist them, / a sign that appears to be three-dimensional / is painted on the floor. // The sign **is of significant help** / in sending people / in the right **direction**. //

**5** Last, / they can be used / at an **intersection** / with no traffic lights. // ✔ ① check **Crosswalk** designs that look three-dimensional / have been painted on some roads / to prevent traffic accidents. // From the **viewpoint** of approaching drivers, / it looks like / large concrete blocks are in the road. // **Hopefully**, / drivers will slow down / when they see them, / before nearing the crosswalk. //

**6** Of course, / the power of optical illusions / is limited. // ✔ ② check It cannot make a garden larger, / nor can it make a ceiling higher. // Over time, / a crosswalk painted to appear three-dimensional / will lose its **effectiveness** / in preventing accidents. // Drivers will come to realize / that what they are seeing / is just an illusion. // ✔ ③ check **Nonetheless**, / with such **limitations kept in mind**, / it should be possible to find / an even wider variety / of useful applications / of optical illusions. //

## Key Sentences



1 Crosswalk designs that look three-dimensional **have been painted** on some roads to prevent traffic accidents.

▶ 〈have + been + 過去分詞〉は受け身の現在完了形。ここでは、「～されてきた」という意味を表す。

訳

2 It cannot make a garden larger, **nor can it** make a ceiling higher.

▶ norは否定の文脈の後で、「また～も…ない」という意味を表す。  
▶ norの後の主語と(助)動詞に倒置が起こる。

訳

3 Nonetheless, **with such limitations kept in mind, it should be possible to** find an even wider variety of useful applications of optical illusions.

▶ 〈with + (代)名詞 + 過去分詞〉は付帯状況を表す副詞句。「～が…されている状態で」という意味を表し、ある状態・動作にほかの状態・動作が付帯していることを表す。  
▶ it should be possible to ...のitは形式主語でto以下が真主語。

訳

## Comprehension

third example



the appearance of a three-dimensional object on a two-dimensional surface

people couldn't find an elevator → three-dimensional sign painted on the floor

significant help



sending people in the right (1) )

last example



(2) ) designs that look three-dimensional

- can be used at an (3) ) with no traffic lights
- painted to (4) ) traffic accidents
- Hopefully, drivers will (5) ) down when they see the sign

the power of optical illusions = (6) )

a crosswalk will lose its (7) ) in preventing accidents



Nonetheless, such (8) ) kept in mind

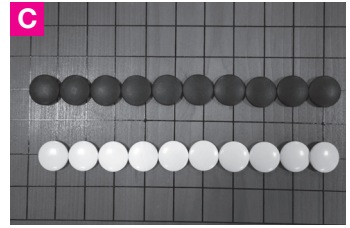
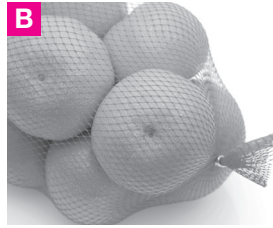
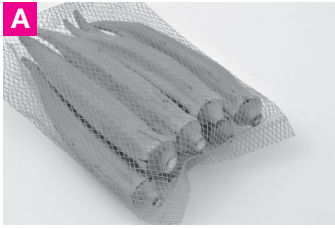
it should be possible to find useful (9) ) of optical illusions



Choose

effectiveness / applications / limited / crosswalk / direction / intersection / limitations / prevent / slow

1 These are examples of optical illusions that we can see in our daily lives. In groups, each choose a different picture and explain how the optical illusion is used.



それぞれの写真の製品ではどんな錯視を使っているかを話し合みましょう。



Name	Photo	What optical illusion is used?

Points of the group work

- Choose one picture you like.
- Try to explain what kind of optical illusion is used in each picture.

- 2** Find another example of the illusion on the Internet and explain the example to your group. After each student has explained the example, decide which example your group will introduce to the class. Also, think about why you chose that example.

〈Photo〉	〈Explanation〉

### Points of the group work

- Find a good example of the optical illusion on the Internet.
- Give reasons why you think the example is good or useful.

目の錯覚の例をインターネットで調べ、グループで発表する例を選びましょう。



- 3** Give a presentation about the example your group chose.

Q: What did you choose?

A: We chose \_\_\_\_\_.

Q: What effects does it have?

A: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

錯視の効果がよくわかる写真を用意しましょう。  
 錯視の効果がどのように役立つかをグループで話し合いましょう。



### Memo

### Points of having a discussion

- Show the class the photo your group chose.
- Tell the class why your group chose that photo.

### Tips for using the Internet

- 画像の出典を明記する (URL・HP名・記載があれば著作者・コピーライトなど)
- 正確なソースを探す (.gov .edu, 公式サイトなど)